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TRANSACTIONS

OF THE

TYNESIDE

NATURALISTS' FIELD CLUB.

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TRANSACTIONS

OF THE

TYNESIDE NATURALISTS' FIELD CLUB.

ADDRESS TO THE MEMBERS OF THE TYNESIDE NATURALISTS' FIELD CLUB,

READ BY THE PRESIDENT, GEORGE WAILES, ESQ., MEMBER OF THE ENTOMOLOGICAL SOCIETIES OF LONDON, FRANCE, AND STETTIN, AT THE FIFTEENTH ANNIVERSARY MEETING, HELD IN NEWCASTLE-UPON-TYNE, TUESDAY, APRIL 9, 1861.

GENTLEMEN—In vacating the office of President, I have to offer many apologies for the imperfect manner in which I have fulfilled the duties devolving upon me, more especially as regards my attendance at the various field meetings of the year, and I have, consequently, in this address, had to rely chiefly on the notes of the proceedings furnished me by our indefatigable Secretary, Mr. Mennell, whose devotion to the duties of that, the most important office of the Club, it is quite needless I should allude to. I regret to have to report very unfavourably of the past year, for never, since the formation of our Club, has it fallen to the lot of its President to lay before his fellow members the record of a season so peculiarly unsuited to the pursuits of a body of out-of-door Naturalists; in fact, it stands alone as the coldest, wettest, and most sunless season of the present century; and I trust Mr. Watson, or some of our members who make meteorology their study, will put

upon record in our Transactions a full and minute account of its unprecedented weather. Here I need only remind you of the great storm of snow on Whit Monday, the 28th of May, which proved so destructive to the broods of game, and in the uplands of our counties fell in many places to a depth of three feet—of the furious wind of October the 3rd, which, as our trees were then in full summer foliage, made such havoc amongst them—and of the sudden, severe, and lengthened frost of December and January. This frost has been most disastrous to trees and shrubs all over Britain, owing mainly to the unripe state in which the shoots were left by the ungenial summer and autumn. Let us hope our zealous member, Mr. Carr, of Hedgeley, will note its effects in our pages, and compare them with the winter of 1854-5. With these prefatory remarks, I proceed to discharge the chief duty of your President, viz., to lay before you the doings of the Club during the year.

The First Field Meeting of the season was fixed for the first of June, at Riding Mill, including a visit to the Devil's Water. When the time for departure arrived, only two members presented themselves, for the morning was a hurricane of wind and rain from the east, and the idea of venturing out in such a storm was abandoned. Instead of this storm, a sharp shower only had been experienced at Riding Mill; and it occurs to me that, in future, it might not be inadvisable to make a telegraphic inquiry as to the state of the weather at the locality proposed to be visited, for these hurricanes—as in the present instance—are often limited in their extent. Six of the members, however, left by a later train, and following the course of the March Burn, proceeded as far as Dilston Castle, and after exploring that neighbourhood, retraced their steps to the Riding Mill, where they dined together, and took the train in the evening to Newcastle.

On the road from Dilston, the party fell in with Mr. Gallon's otter hounds returning from North Tyne, where they had killed two fine otters. These specimens of this unwelcome inhabitant of our rivers were examined with much interest.

I am not aware that any rare or local plants were gathered on

the occasion, and of insects, the only butterfly seen was the "Orange-tip"(*A. cardamines*). Amongst the *Coleoptera*, *Bembidium littorale* and *B. nitidulum* were collected, as well as *Coccinella* 14-*guttata*, which was abundant on the bushy willows bordering the stream.

The Second Field Meeting was appointed for the 27th of June, and the locality fixed on was that favourite spot, Castle Eden Dene, which, as heretofore, was thrown open by its now sole owner, Rowland Burdon, Esq. The members from Newcastle travelled by way of Ferryhill—which, if I may be permitted the digression, seems a locality that would well repay the researches of the members of the Club, whether geologists, botanists, or entomologists, on some future day—and reaching the Castle Eden Station shortly after ten a.m., proceeded at once to the dene. The footpaths and road unequivocally told what the previous weather had been, although the morning was fine, with a strong westerly wind. On entering the wood, it was soon discovered that any attempt to leave the beaten track would be, if not impracticable, at least most uncomfortable. The route chosen led to the well-known romantic "Gunner's Pool." So far as the supply of water was necessary to give effect to this beautiful spot, there was nothing to complain of, though the approach was both difficult and hazardous, from the slippery state of the paths and rocks. A few of the more adventurous of the party, regardless of all obstacles, scrambled up the steep ascent to the summit, but the majority, after enjoying the scene, were content to turn their steps towards the sea. On the way a specimen of *Emmelesia Blomeraria** was met with, just emerged from the pupa, and it being a female, I was most anxious to obtain eggs, so as to elucidate its history. Unfortunately, the few deposited proved barren, and as no other specimen was seen, the opportunity of investigating its metamorphoses, which are entirely unknown, has been postponed. Here, too, every one noticed the great profusion of the beautiful "scarce magpie moth," *Abraxas ulmata*,

* This insect I discovered in the dene in 1831, and then took in considerable numbers. Its only Continental habitat is on the borders of the Ural Mountains, where it occurs very rarely.

which, from its habit of sitting on the upper surface of the leaves of low plants, especially those of *Mercurialis perennis*, presents so conspicuous an object to the most careless passer by. So abundant was the insect that it might almost be said there was one to every square yard of ground where the *Mercurialis* grew, and amongst them a very remarkable variety was found nearly approaching the *Ab. pantaria* of southern France. A little further on, specimens of the common spring butterfly, the "orange-tip," *Anthocharis Cardamines*, were captured in fine condition, proving beyond doubt how very late the season was, and in many parts the hawthorn was in full bloom, and lilies of the valley in flower. Proceeding onwards towards the sea the usual plants of the dene were observed, but those of the rare Elecampane, *Inula Helenium*, which grew by the road side, had disappeared, most probably destroyed by the passing of carriages, as no one would think of removing a plant like this. A few of the "fly orchis," *Ophrys muscifera*, were seen in the dene, and considerable numbers on the sea banks. The *Micro-lepidoptera* were so scarce that hardly a dozen were disturbed during the whole day, and those of the most common species; and the *Macro-lepidoptera*, with the exception of *Abraxas ulmata*, equally so. Even the usually ubiquitous *Melanippe montanata* and *Larentia didymata* were extremely scarce; and the search for the rare *Emmelesia tæniata*, one of our very local species, was unsuccessful. Single specimens of the butterflies *Melitæa Euphrosyne* and *Hesperia Sylvanus* were captured further down, and near to the sea a few of the "Wall" Butterfly *Satyrus Megæra*, and of the males of the "common blue" *Polyommatus Alexis*, but nothing was seen of the interesting "Durham Argus," or of the rare *Thera simulata*, both of which in an ordinary season would have been on the wing. A few *Coleoptera* were captured, including several specimens of our northern species, *Telephorus cyaneus* (of Curtis), and *Pyrochroa rubens* (one of which had the anthers of some orchid attached to its head, which I should rather regard as an accident than agree with Mr. Darwin's notion, that this was a particular insect required to fertilize some particular species of orchid). *Otiorhynchus atro-apterus*, *Cionus*

scrophulariæ, *Cœliodes Geranii*, *Adrastus limbatus*, *Cassida rubiginosa*, and *Chrysomela varians*, were also taken. Arrived at the sea shore, some of the party started for the well-known Black Hall Rocks, whither the members from Sunderland, who had reached the dene by an earlier train, had already proceeded, and there a new crustacean, described in a recent paper read at our last Marsden meeting by its discoverer, Mr. Norman, was met with. Others lingered on the sea banks, and gradually wended their way up the dene to the railway station, taking the trains for Sunderland and Ferry Hill, as the length of the day's excursion rendered the usual assembling of the members impracticable.

The Special Meeting for Teesdale was appointed for the 16th, 17th, and 18th of July. On the 16th, eight members left Newcastle by the early train for Alston, whence they took conveyance for Harwood Head. On the way the steep ascents often compelled them to walk, on which occasions the following plants were gathered on Yad Moss, *Saxifraga stellaris*, *S. hypnoides*, *Epilobium alsinifolium*, (unusually large and fine,) and *Lycopodium selaginoides*. The beautiful *Viola lutea* and *Primula farinosa* (now almost over) and *Stellaria verna*, coloured the banks as they passed along. At Harwood or Askgill Head they left the conveyance and crossed the fields to Harwood Beck. The meadows abounded in Orchises, *Habenaria chlorantha*, *Orchis viridis*, *conopsea*, and the dark form of *latifolia*. Crossing the stream at the little church, they ascended the opposite Fell, noticing by the way *Lastræa oreopteris*, *Cystopteris fragilis*, *Polypodium phegopteris*, and *dryopteris* in great profusion. After a tough climb the summit was gained, and afforded a fine prospect of the valley of the Tees and the neighbouring Fells—Cronkley Fell, Mickle Fell, and the richly wooded valley of the Tees below the High Force being the chief points of attraction. They then gradually descended towards the Tees, noticing on the route many nests of the red grouse, the eggs in which had been destroyed by the snow storm of the 28th of May, when the birds were sitting: in one case the old bird was observed dead on the nest. The Tees was reached just above the Weel, and here specimens of *Chortobius Davus* were captured.

The beautiful fall of Cauldron Snout was the next object of attraction, and in its vicinity *Asplenium viride* and other ferns were seen in great beauty. Passing onwards, to the basaltic cliffs of Falcon Clints, many plants were gathered, including *Arbutus uva-ursi*, *Vaccinum vitis-idæa*, *Hieracium pallidum*, and *vulgatum Epilobium angustifolium*, but the little *Woodsia* was sought for in vain, which, as well as *Aspidium lonchitis*, seems nearly eradicated. Following the course of the river, the well-known Widdy Bank was soon gained, and here *Orchis albida*, *Bartsia alpina*, *Gentiana verna*, and other rare plants, were gathered, and the party proceeded to the High Force Inn, where they remained for the night. Next morning most of them, accompanied and guided by Mr. James Backhouse, jun., of York, started on an expedition to High Cup Nick, at the head of Maize Beck, following the same course as on the previous day, until they reached the spot where that rivulet joins the Tees. On the route to this interesting spot were gathered, though of course out of our boundaries, *Tofieldia palustris*, *Polygala depressa*, *Potentilla alpestris*, and *Myosotis repens;* and after reaching their destination, and enjoying the magnificent panorama around them, embracing as it does the vale of the Eden and the mountain ranges of Westmoreland, Cumberland, and Dumfries-shire, they returned by the same route to the inn they had left in the morning. The remainder explored the neighbourhood of the High Force, and walked down to Winch Bridge, gathering specimens of *Melampyrum sylvaticum*, *Potentilla fruticosa*, *&c.* The following morning the White Force and Cronkley Fell on the Yorkshire side of the Tees, and the locality of *Dryas octopetala*, *Polygala austriaca*, *Helianthenum canum*, and other rare plants, were visited, and, recrossing the Tees at Widdy Bank, they returned by the course of Langdon Beck to Harwood, where conveyances awaited to carry them to Alston. On the journey they obtained excellent views of the great solar eclipse, the watery clouds forming an admirable substitute for smoked glasses or other similar contrivances. At Alston they dined, elected two gentlemen members of the Club, and returned to Newcastle in the evening by rail. A few insects besides those mentioned above,

were collected, including *Carabus nitens*, *Atopa cervina*, *Hylobius abietis*, and *Chrysomela varians*, amongst the *Coleoptera;* and *Melitæa Artemis*, *Chelonia Plantaginis* and *Mixodia Schulziana* amongst the *Lepidoptera.*

The Third Field Meeting for the season was held at Fourstones and Newbrough on Friday, the 27th of July. The main party of the members started by the early train of the Newcastle and Carlisle Railway, in accordance with the announcement of the circular for the Fourstones Station, and the morning being fine, enjoyed greatly the scene as they passed along on this the most picturesque of our railways. At Hexham, other members joined the party, and on reaching the Fourstones Station, they found the Rev. W. T. Shields and Mr. Benson, the proprietor of the celebrated lime kilns there, awaiting their arrival. By the kindness of the latter, a most substantial breakfast had been provided, to which the large party did ample justice. The sky by this time became very threatening, and heavy rain fell, but, after some debate, it was determined to proceed, and the larger portion of the members then present, under the guidance of Mr. Shields, followed the route prescribed by the programme to Warden Hill, on the summit of which the remains of a fine Roman camp were examined. As usual, it is circular, and about 100 yards in diameter, surrounded by a triple rampart of earth and small stones. Here the party lingered for some time, delighted with the extent and beauty of the views obtained of both branches of the Tyne from this elevated spot. They next descended to the Mountain Limestone Quarries on Frankham Fell, where the undulations of the strata attracted much notice, and the hammers of the geologists were busily engaged in search of fossils, which abounded. The various geological features both here and throughout the entire route, were pointed out and explained by Mr. Belt, in a manner which deeply interested the whole party. The Prudham Freestone Quarries, which produce the fine sandstone so much used in these northern parts, and from which immense blocks can be readily obtained, were next visited, and Mr. Benson afforded the party valuable information respecting them. Here a considerable addition was made to the company by the joining of

several members who had arrived by a later train. The route then lay over a large extent of pasture land, crossed by several picturesque ravines; and on arriving at Grayside Farm, the members received another practical illustration of the hospitality of Tyneside, in the form of an ample supply of wine and biscuits, furnished by Alexander Bartleman, Esq., which was very acceptable after so long a walk. The majority then proceeded to the Stonecroft Lead Mine, the interior of which was inspected by some of the members, whilst others were conducted by Messrs G. Ridley and Benson over the various and interesting external works for washing and dressing the ore, and had explained to them the several operations going on. Others accompanied Mr. Bartleman to his herd's house on the summit of the hill north of the farm, whence a most extensive view was obtained on all sides. This terminated the day's wanderings, and the party, returning to Newbrough, were again hospitably entertained by Mr. Ridley.

The entomologists and botanists desirous of visiting that rarity in these days of drainage, a "bog," now that their favourite locality, Prestwick Car, is utterly destroyed, started for the well-known "Muckle Moss," which is the most accessible left to us. Owing to their being misdirected, they passed by the Stonecroft Lead Mines, and traversing the large grassy hills of Grayside, reached the place of their search much later than they anticipated. Little worthy of particular notice was observed on the way, except *Asplenium trichomanes*, growing in a shady lane near the church, and only the common butterflies, *P. Brassicæ*, *H. Janira*, *C. Pamphilus*, and *P. Agestis*. On arriving at the Moss, *Narthecium ossifragum* was found in great profusion, and most brilliantly in flower, and the ground was literally carpeted with the Cranberry, covered with its fruit. Specimens of *C. Davus* were soon disturbed and captured, as well as *Anarta Myrtilli* and *Mixodia Schulziana*, but not one of the beautiful *Carsia imbutata*, which was the chief object of the visit, could be met with. Here specimens of *Anchomenus Ericeti* were captured by Mr. Perkins, and added to our local coleopterous fauna, as well as others of the subalpine *Geodephaga*, *Omaseus orinomus* and *Patrobus lapponicus*, and the rare *Coccinella oblongo-guttata*. A smart shower of

rain soon compelled the party to seek shelter in one of the plantations which adjoin the Moss, and on its partially clearing up, the plantation itself was explored, and the following *Lepidoptera* captured:—*Ellopia fasciaria*, *Amphidasis Betularia*, *Alcis Abietaria*, *Macaria liturata*, *Fidonia pinetaria*, *Coremia minutaria*, with some others less rare, and the botanists secured numerous specimens of *Pyrola minor* in beautiful flower in this new locality for that interesting plant. Another attempt was made to investigate the Moss, but a return of the heavy rain caused the project to be abandoned, and the party reached Newbrough just in time to join those at the dinner table who had taken the other route. An excellent dinner was served in the Newbrough Mechanics' Institute, to which thirty-nine sat down. After dinner, the Rev. J. F. Bigge read a paper "on some curious incised stones" recently found in Northumberland, supposed to be plans of camps, which has since appeared in our "Transactions," and related some interesting facts connected with Newbrough and its vicinity, as follows:—

MR. BIGGE'S NOTES ON NEWBROUGH.

Carrow.—A figure of Neptune was found in a bog, and built up in the gable of a cottage at Carrow. It was taken down in 1790, and is now at Wallington.

Sewing Shields.—Here are the "Cave of Enchanted Warriors," where King Arthur and his court are enchanted, and a high rude stone called "King Ethel's Chair."

Newbrough.—Founded and formed into a borough by the Cumin family at the beginning of the reign of Henry III., when they obtained a charter for a market at Thornton, which was the name of the estate upon which this *new burgh* was situated. The grant for the market was dated June 20, 1221.

Here it was that Edward I. and his court, on their march westward in 1306, lingered from July till September.

Here also, on April 19, 1311, Richd. Kellon, a monk of Durham, was presented, as bishop elect of that see, to his Metropolitan, the Archbishop of York, who was probably on a visit at Hexham.

In 1568 the principal names of the families were Stokoe, Glenwright, and Lambert.

Mr. Richard Lambert, an eminent surgeon in Newcastle, one of the old

stock, in 1751, at a meeting (convivial) in the town, suggested the establishment of an Infirmary.

St. Mary's Well.—Many marvellous cures performed; it is still said that no reptile can live in it.

Longevity at Newbrough.—Alice Wilson, aged 111, April, 1763, Jane Hogarth, aged 106, April, 1765.

He also observed, that "it would be a good thing if any one living in the district which we visit, would draw up for the meeting an account of remarkable places, legends, quaint stories, people, ruins, churches, &c., belonging to the spot; we might by this means rescue many an old history worth preserving from oblivion."

The Rev. W. T. Shields related that he had noticed on the high road, near Lanchester, several small birds, evidently killed by the hailstones of the severe storms that had recently occurred; and after the events of the day had been discussed, a vote of thanks enthusiastically carried to those who had so hospitably entertained the party during the day, and nine gentlemen elected members of the Club, the meeting broke up, and a somewhat hurried walk to the Fourstones Station, enabled the members to return by the evening train to Newcastle. One of the most gratifying circumstances attending this meeting, was to notice the number of youths who zealously took part in the various proceedings of the day, proving that the study of nature, out of doors, so peculiarly fitted for the young, was making great progress in the district, and promising a band of recruits to maintain the effective force of the Club in future years.

The Fifth Field Meeting was held on Wednesday, the 22nd of August, on the banks of the Wear, in the vicinity of Brancepeth. I was unable to be present, and have to depend chiefly on the notes of our worthy Secretary, for an account of the meeting, at which thirteen members were present. The day was most unfavourable, and the wanderings of the party carried on under umbrellas in a heavy continuous rain. They quitted the railway at the Willington Station, and following the course of the Wear, proceeded as far as Sunderland Bridge, retracing their steps to Brancepeth. Mr. Perkins collected a few insects, of which

only our local *Bembidium testaceum* and *Crœsia Forskaleana* need be mentioned. This is a new locality for the former, and the latter is, as far as I know, an addition to our local fauna. Many traces of the work of the larvæ of *Sesia bembeciformis* were observed in the stems of the willows by the river side. Arrived at Brancepeth, the members were, through the courtesy of Viscount Boyne, admitted to the castle and grounds. The former is said to be the earliest castellated building in the county, dating before the Norman conquest, and in its general effect, if equalled, is certainly not surpassed by any of our northern castles.

The gardener, Mr. Dale, an intelligent and accurate observer of Natural History, conducted the members over the gardens and grounds, and showed them a collection of birds and eggs, made by himself in the neighbourhood, amongst which was a male specimen of the black cap, *Sylvia atricapilla*, which he shot on the fifth of December, about twelve years ago, feeding on the berries of the privet, and he stated that about two years subsequently he had also shot a female of the same species, about the same period of the year. These summer visitants, therefore, in all probability, remain occasionally with us throughout the winter, resorting to these warm sheltered spots, and obtaining from the privet and similar late fruiting shrubs, the food in which they so much delight. He also showed them a nest and eggs of the Siskin, *Carduelis spinus*, taken there some years ago, remarking that he had the year before noticed a nest of the young birds. These are the only known instances of this species breeding in England, though it does so pretty abundantly in Scotland. The nests were found amongst the boughs of some spruce firs, which Mr. J. Hancock informs me is their usual position in Scotland. The beautiful church was also visited, and the fine carvings which it contains were greatly admired, especially the chancel screen and stall work. These are allowed to be worthy of the best period of Elizabethan architecture. After dining together, the members returned by a late train to Newcastle. Three members were added to our list at this meeting.

The Sixth Field Meeting was held at Hartley Burn on Friday, September the 14th. The members left Newcastle by the early train for the Slaggyford Station, on the Alston Branch of the Newcastle and Carlisle Railway. On reaching that place they proceeded to Knaresdale Rectory, on the kind invitation of the Rev. Henry Morton, where they were most hospitably entertained to breakfast. Leaving the rectory, they bent their steps to the waterfall in Glendue Burn, and thence across the "Maiden Way" over Hartley Burn Fell to the Black Burn, which they reached about half-way down its course, and not at its head, as originally proposed, for owing to the wetness of the day, they were but too glad to seek the shelter of the inn at Halton Lea Gate, where they dined, and returned to Newcastle by the train, leaving the Lambley Station at six p.m. This excursion promised to have afforded to the geologists much that was interesting in the stratification of the bed and sides of Hartley Burn; and even in spite of the disheartening state of the weather, the members often gathered round Mr. Howse, and listened with pleasure to his interesting explanations of the appearances presented by the rocks which were passed on the way. The botanists merely gathered a few specimens of ferns—*Polypodium phegopteris* and *P. dryopteris*, in fine condition at Glendue Burn, and *Allosorus crispus*, *Polystichum aculeatum*, and *Asplenium trichomanes*, on the banks of Hartley Burn.

The Seventh and Concluding Field Meeting, as fixed by the programme, was held at Whitburn and Marsden, on the 10th of October. Owing to the showery morning but few assembled at the railway station, and of these some were deterred from proceeding by the prospect of the day turning out, as it unfortunately did, decidedly wet. Those who ventured further on the chance of its improving, left the railway at the Cleadon Lane station, and at once set out for the village of Cleadon, and sought shelter under the roof of our indefatigable member, the Rev. G. C. Abbes, glad to escape from the continuous rain. Here several hours were profitably passed in examining the large and varied collection of curious specimens of the forms assumed by the magnesian limestone of the neighbourhood, which Mr. Abbes has

amassed during a long series of years. A stroll through his grounds under umbrellas was next ventured on, and the devastation of the hurricane of the 3rd instant noticed, of which the most interesting object was one of an avenue of English elms about 40 feet high, that had been snapped off about four feet from the ground. On inspecting the stump it was found that, with the exception of an outer circle of sound wood, about an inch thick, the whole trunk had been by fungoid action converted into what is well known as "touchwood," thus rendering it unable to withstand such a gale. Further examination of the broken limbs of other trees in the same avenue indicated that in all probability the whole were more or less similarly affected, and that their total destruction by the fungus was a mere question of time. Whether this arose from some peculiarity of the soil or subsoil, there was no opportunity of investigating; but now that the fungi are ascertained to act upon living trees in a manner either unknown or little heeded in times past, it would not be an uninteresting subject for inquiry in this particular locality where their ravages were so well marked.

Undaunted by the continued rain, the party, led by Mr. Abbes, walked to Whitburn, and keeping the high road for some distance proceeded to the sea shore near Souter Point, intending to travel by the beach to the place of rendezvous, but the rising tide frustrated this object, and the wet and slippery rocks had to be scaled on hands and knees, and wet grass and stubble fields traversed ere the welcome caves of shelter were reached. Here, acting under the judicious advice of Dr. Embleton, means were taken to obviate the ill effects of so many hours spent in the wet, and the weary troupe being joined by a few others who had proceeded direct to the place of meeting, sat down to an excellent tea. A second pilgrimage in the dark through wet fields and muddy lanes brought them to the Cleadon station in time for the 7 p.m. train to Newcastle. It is unnecessary to mention that collecting of any kind was quite out of the question, and that the usual places of interest were passed almost unnoticed in the continued and unceasing storm of wind and rain, which seemed a *finale* quite in keeping with the wretched weather that had

attended most of the previous meetings. So much regret was expressed by many members of their being unable to attend the meeting at Whitburn and Marsden on the 10th of October, from the inclemency of the weather, that the Committee resolved to hold another at the same locality on Wednesday, the 24th. Most fortunately the day was very, nay, unusually fine, and the muster the largest that has ever occurred since the formation of the Club. The Life-boat House at Whitburn was fixed as the starting point, and from this they proceeded by the shore to the north. Mr. J. W. Kirkby, of Sunderland, on the route directed attention to, and explained the deposits of the northern glacial drift which rests upon the permian cliffs. Mr. Richard Howse also pointed out the many interesting features of the magnesian limestone forming the beautiful cliffs of this part of the coast, which has been so carefully studied by him, as our Transactions afford ample proof. Others made the rock-pools of the shore the field of their research; and at Byers' Quarry, as heretofore, the geologists found abundance of minute fossils to reward the labours of their hammers.

On reaching the well-known "Grotto Hotel," upwards of 70 members sat down to a substantial tea; after which, the Rev. H. B. Tristram took the chair, and six gentlemen were elected members of the Club. The Rev. A. M. Norman then read a paper, since printed in our Transactions, "On an undescribed Crustacean of the genus Mysis," which, as mentioned above, had been found by him at the Castle Eden meeting of the Club, and the Secretary, Mr. Mennell, some memoranda on the habits of various insects, and the occurrence of entomological rarities within the district, by Mr. Bold. These have also been printed. Allusion having been subsequently made to a living Toad reported to have been found, as usual, in the solid limestone rock, near Sunderland, various members present detailed the particulars of the case as far as known; and Mr. Norman added an interesting account of a number of experiments he had made to ascertain the powers of endurance possessed by the Toad when deprived of food and air, and also others, to show the extremely small apertures through which this animal can make its way. Votes of

thanks were then proposed and carried with acclamation to Mr. Kirkby and Mr. Howse for their expositions of the geological features of the coast, and to Mr. Norman and Mr. Bold for their papers, as well as to the indefatigable Secretary, Mr. Mennell, for his services, and the large meeting broke up amidst mutual congratulations on the successful close of the campaign. I am not aware that any novelties were added to our local fauna on the occasion, or any rarities noticed; indeed, the lateness of the season and the previous inclement weather almost precluded the possibility of this occurring.

Turning from the out-of-door doings of this unfavourable season to those which have been held in the rooms of the Literary and Philosophical Society, I may mention that a fourth evening meeting of last session was held on Thursday evening, the 12th of April, when a paper "on the British Marine Algæ," with notices of some of the rarer local specimens, by Mr. George S. Brady, was read. This, with modifications so as to convert it into a local list, has since appeared in our Transactions, and it is barely doing it and its talented author justice to say that it forms one of the most valuable contributions that has yet been made to our acta. May we hope, that with such an example before them, others of our body will take up the other departments of our cryptogamic flora. This was followed by a paper "on Climate," by Mr. John Watson, F.R.A.S., who has devoted so much attention to meteorology, and was illustrated by diagrams. Mr. Mennell read a paper entitled "Notes on the Rainfall of 1859," which is already in the hands of our members. Mr. J. W. Kirkby then read a most valuable paper "on the Permian Chitonidæ," which, with additions and corrections, has been reprinted in our Transactions from the "Quarterly Journal of Geological Science."

On the evening of the last anniversary, March the 29th, 1860, another Microscopical Soiree was held in the Museum of the Natural History Society, in connection with that Society and our Club, equally attractive and interesting, and upon a more extensive scale than its predecessor. No fewer than 36 microscopes were arranged on the table, many of them being instruments of first-rate quality, with every appliance which the most recent

inventions and improvements of this now really indisputable aid to the study of natural science furnish. It is quite needless here to enumerate the objects submitted to the inspection and study of the meeting. In the lecture-room of the College of Medicine the Rev. H. B. Tristram gave, in a brief lecture, an interesting account of the geological features of the Sahara, or great Desert of Northern Africa, the result of his own personal observations; and Dr. Embleton followed with a short lecture on some of the vegetable and animal substances exhibited under the microscopes, and after referring to their various properties of extensibility, porosity, &c., explained in connection with the structure of these tissues the circulation of the sap in plants and of the blood in animals. Refreshments in the shape of tea and coffee were provided, and the evening was passed most agreeably, and but one feeling of entire satisfaction expressed by the numerous company.

The First Evening Meeting of the session was held on Tuesday, the 29th of May, 1861. There was a considerable number of members present, and after the election of 15 new members, Mr. Richard Howse read an interesting paper, being "An Account of the deposits exposed during the excavations at Jarrow Slake, with remarks on other deposits of similar age elsewhere," and illustrated it by drawings and a large number of specimens, including those of a supposed new mineral, of which Mr. Jasper Browell read an analysis, and proposed for it the provisional name *Jarrowite*. This valuable paper, with Mr. Browell's analysis, will, I understand, soon appear in our Transactions. At its conclusion a long and animated discussion on the various animal and vegetable remains and fragments of rocks, found during the excavations, took place. Mr. D. P. Morison also read a paper on a Spider, *Neriene errans*, which he had found inhabiting the underground workings of Pelton Colliery gregariously, and covering immense surfaces with its web. Some fine examples, both of the Spider and of its web—the latter clothed with particles of coal dust—were exhibited, and the paper will appear in our Transactions. Here allow me to refer to the splendid volume issued by the Ray Society, on the British Spiders, by the

talented Naturalist, Mr. Blackwall, who has so long studied them, and to express a hope that some of our members will be tempted to engage in the study of this neglected portion of our fauna, and favour us with a catalogue of our local species, which I believe will be found more numerous than supposed. Mr. R. C. Clapham then read a valuable paper upon "the natural formation of Iron Pyrites," similar to that with which he has already favoured the Club, on Sulphur, and which will also appear in our pages. Some beautiful microscopic algæ, found by our painstaking member, Mr. Thomas Athey, were exhibited under the microscope, and described in a paper by Mr. Tuffen West, F.L.S. The meeting was concluded by the reading of a most interesting paper by the Right Hon. Lord Ravensworth, forwarded through Mr. John Hancock, "On the Changes of the Plumage in the Cock Pheasant," illustrated by specimens, and which will, I believe, be printed. This converse of the usual changes of the "male birds" of the Pheasant consisted in the male partially assuming the plumage of the female, and an instance was mentioned in which the spurs had undergone a change in form from those of the ordinary Cock Pheasant. His Lordship also remarked on the occurrence of considerable numbers of these "androgynous" mutations during the late year, for as scarcely any young birds survived the storms of the cold breeding season, the gamekeeper had to resort to old birds to supply the larder.

The Second Evening Meeting was held on Thursday, the 14th of March last, and was numerously attended. After the election of seven new members, an exceedingly interesting paper "On the Common Brittle Star, *Ophiocoma rosula*, with some remarks on the growth of the rays and their appendages," was read by Mr. Hodge, and a large number of microscopic preparations of the various portions of this curious creature, as well as drawings of great beauty, shewed how imperceptibly the parts assumed forms and proportions apparently at variance with those originally developed. The reading of this was followed by an equally valuable contribution by Mr. Tuffen West, F.L.S., "On the Feet of Insects," being an abstract of a paper prepared for the Linnæan Society, illustrated by numerous drawings and

microscopic preparations. If we had not been promised an epitome of the paper for insertion in our "Transactions," I should have considered it my duty to have entered at length into this highly interesting subject; suffice it to say that the old notion, that a series of "suckers" on the underside of the tarsi of insects enabled them to adhere to smooth substances, and walk in inverted positions, was shown to be fallacious, and that in reality it was to the presence of a vast number of cup-shaped processes, covered with small hooked bristles, that they were indebted for the power. It really seems strange that such a paper should not have originated with some professed Entomologist, and argues a want of scientific investigation not at all creditable to that body of Naturalists. Our worthy Secretary, Mr. Mennell, next presented his usual abstract of the returns of the Rain-fall for 1860; suffice to say it greatly exceeded the average.

This was followed by a paper from Mr. V. R. Perkins, entitled "Familiar Instructions for young Entomologists," (confining the portion then read to the *Lepidoptera*), which was replete with valuable personal observations and remarks on the order, which would prove highly interesting and useful not only to the younger members of the fraternity it was addressed to, but afford hints and reminiscences to those further advanced in the study. Mr. John Hancock also exhibited to the meeting a model of the celebrated egg of the Great Auk belonging to the Liverpool Museum, formerly that of the late Earl of Derby, at Knowsley, which had been entrusted to him for the purpose. So perfect and so beautiful was this model that few would have suspected that it was in reality only a plaster copy. The exquisite and innumerable markings had been reproduced in a manner most strikingly natural and beautiful, and perhaps amongst all the different delicate manifestations of natural objects, for which Mr. Hancock is so well known far and near, this might be pronounced the most wonderful of all. This concluded the meetings of the year of my office, and in quitting that portion of our doings, and turning to the printed records of the labours of our members, I have the satisfaction of reminding you that two parts of our "Transactions" have issued from the press in the course of the year. It is un-

necessary for me to draw attention to the various valuable papers they contain, as they have been for some time in the hands of the members; but I cannot omit referring to the address of my talented predecessor and his masterly review of Mr. Darwin's celebrated work which has caused such sensation throughout the scientific world, and I am persuaded that every member of the Club has read and re-read it with delight, and with a feeling of honourable pride that our "Transactions" should record views on the subject, in which all of us must, I think, concur.

It has hitherto been usual in these addresses to refer to the labours of those members who have been, during the year, actively engaged in various departments of natural science, and I may mention that at the meeting of the British Association, held at Oxford in June last, John Hogg, Esq., F.R.S., one of our former Presidents, read an interesting paper "on the Distinctions of a Plant and an Animal," which has since appeared in the "Edinburgh New Philosophical Journal," vol. xii., p. 216. In this he suggests, as it is impossible for man to determine whether a certain minute organism be a plant or animal, a fourth or additional kingdom, entitled "*Regnum Primigenum*," which should contain all those lower, or the primary organic creatures, the *Protoctista*—comprehending both the *Protophyta* and *Protozoa*—the former having more the nature of plants, and the latter the nature of animals; while for those formless or amorphous beings, whether they partake more of the animal or vegetable nature, he suggests the name of *Amorphoctista* instead of *Amorphozoa*, formerly bestowed on them by the French author, M. de Blainville.

In Geology, Mr. J. W. Kirkby has communicated to the Geological Society two papers, which have appeared in their quarterly journal, viz.:—"On the Occurrence of *Lingula Credneri*, a Permian brachyopod, in the coal measures of Durham, and on the Claims of the Permian Rocks, to constitute a system," and "On the Permian Rocks of Yorkshire." Mr. Thomas Athey has obtained from Cramlington Colliery a large and interesting series of remains of Fish, and probably Reptilia, similar in character to those discovered by Mr. Kirkby, at Ryhope. In

Zoology and Botany, Mr. Albany Hancock has been engaged in studying the anatomy of the *Cephalopoda*, and the result of his investigations will be to add greatly to our knowledge of the circulatory and aquiferous systems of these animals. Mr. Alder's attention during the last year has been chiefly directed to the study of the *Tunicata*, the British species of which he has engaged to catalogue and describe for the British Museum. Three or four new species have been found on this coast, and the lists will probably be increased by further search. Last summer he also obtained two new Zoophytes at Cullercoats, and had the opportunity of tracing the development of some of the rarer species hitherto imperfectly understood. Amongst the new species is a small Hydractynia, producing free Medusoids. He has also described in the Annals of Natural History for February, 1860, a new Zoophyte (*Campanularia fastigiata*), and two new Echinoderms (*Comatula sarsii* and *Phascolosoma radiata*), dredged by Mr. Barlee at the Shetland Islands. The Rev. A. M. Norman is engaged in preparing a Catalogue of the Crustacea of Northumberland and Durham for the Society's "Transactions," in which he would be glad of assistance from local observers. He has added another species to the British Fauna of Fresh-water Mollusca, viz., *Physa acuta*, and has described in the Annals of Natural History for February, 1861, an Echinoderm from Ireland, for which he has formed a new genus. Dr. Donkin has described in the "Quarterly Microscopical Journal" for January, 1861, 15 new species of *Diatomaceæ* from the Northumberland coast, and he is engaged in preparing a general catalogue of the local species for the Club. Mr. Geo. Hodge has been closely engaged in Microscopical investigations amongst the smaller Marine Crustacea and Radiata, with especial reference to their metamorphoses. Mr. R. Howse has taken *Acmæa testudinalis* at Hartlepool, which is interesting as another fact to prove the southern migration of this shell, which has been traced from point to point in successive parts of the Society's "Transactions." Messrs Bold and Perkins have, in spite of the unfavourable season, made several additions to our local Coleopterous fauna, and the Rev. H. B. Tristram has published an interesting account of his Travels in the Sahara and

beyond the Atlas, which contains much valuable information on the natural history of that little-known country. He has also completed a series of valuable papers in the "Ibis" on its ornithology. In conclusion, I am sure it will gratify all our members to know that our late Secretary, Mr. D. Oliver, jun., has recently been elected to fill the chair of Botany in the University of London, vacated by Dr. Lindley. Such have been the labours of our members during the year, and I have the gratification of announcing that no fewer than *fifty-two* new members have been added to our now large and lengthened roll; some, doubtless, have been removed from amongst us; and there is one in that mournful list whose name ought not, in a report like this, to be passed over in silence. I allude to the late Mr. William Hutton. I may affirm, without fear of contradiction, that to him the Naturalists of Tyneside owe more than to any other individual. It was to his great and untiring exertions that we are indebted for our magnificent Museum, so rich in every department of our science, and especially in that to which he was personally devoted—Geology, so important in this district. The Fossils of our Coal-field first found an exponent in him; and, in conjunction with Dr. Lindley, he published that beautiful and valuable work, the Fossil Flora. The Transactions of the Natural History Society also owe very much of their value to the various papers on the Geology of the North of England, which emanated from his pen. In short, whether we consider the ardour with which he pursued the study of Natural History, the perseverance and success with which he enlisted the co-operation of those who had the means of favouring its progress, or the willingness with which he communicated his great personal knowledge to the enquiring student, his memory deserves to be gratefully remembered by every one of his fellow members.

Members Elected since the last Anniversary.

At the Anniversary Meeting:—Francis Bennett, M.R.C.S., John Brunton Falconar, of Gateshead; Drewitt O. Brown, Jarrow Hall; Rev. Edward Shortt, John Brown, and John Burnup, Jun.,

of Newcastle; Richard Lawrence Pemberton, Esq., The Barnes, Sunderland; Alexander Bartleman, Hatheridge House, Hexham; Matthew Lee, Wester House, Hexham; and Richard Taylor, M.R.C.S., Whickham.

At the Fourth Evening Meeting:—Barnard S. Proctor, of Newcastle; W. G. Moore, of Lambton; and W. H. Richardson, of Sunderland.

At the Riding Mill Meeting:—William Benson, Allerwash House; George Ridley, Newbrough; Thomas Fordyce, Warden; G. B. Morgan and Matthew Francis, Sunderland; G. W. Richardson, Newcastle; and John Ridley, Cockshaw House, Hexham.

At the Castle Eden Meeting:—W. H. G. Johnson, Esq., Hardwicke Hall; J. T. Bell, and Thomas Thompson, Sunderland; W. L. Watson, and J. P. Glaholm, Newcastle.

At the Teesdale Special Meeting:—Rev. Henry Morton, Knarsdale; J. F Spence, Jun., Chirton.

At the Newbrough Meeting:—Rev. James Cundill, Muggleswick; Rev. J. Coates, Anick; Rev. — Westbrook, Wall; Rev. Jos. Smithard, Cramlington; Albany Featherstonhaugh, Roker House; Thomas Sample, Bothal Castle; Rev. R. Kirwood, Sunderland; Charles Magnay, Settlingstones; George Robinson, Hexham.

At the Brancepeth Meeting:—H. B. Fell, Westoe; John Garrett, Newcastle; John Daglish, Hetton; Thos. Fenwick, C.E., North Shields.

At the Hartley Burn Meeting:—Edward Maxwell, South Shields; Blaydon Dawson, and — Meggison, Westoe; William Burnup, Warden House; Nicholas Temperley, Westfield House, Hexham; Robt. S. Briggs, The Cedars, Sunderland.

At the Second Marsden Meeting:—Philip Messent, C.E., Tynemouth; Thomas Richardson, Hudworth House; Richard T. Manson, Heighington; Edward Wright, Newcastle.

At the First Evening Meeting:—Philip Brown, M. D., Blaydon; J. S. Denham, M.R.C.S., South Shields; Thomas Jackson, Jun., Thomas Haswell, Robert Sutherland, of North Shields; Rev. Alan Greenwell, Durham; John W. Popplewell,

Preston; Robert C. Clephan, Gateshead; John Geo. Richardson, Geo. Welford, M.R.C.S., William Morgan Wake, and William Young, Sunderland; William Forrest, Newcastle; Tuffen West, F.L.S., Dalston, London; Rev. Geo. West, Greenside.

At the Second Evening Meeting:—Capt. A. Noble, R.E., Luke Armstrong, M.R.C.S., Rev. W. Lillie, David Cram, and — Murray, Newcastle; W. H. Glover, Dilston; Robt. Cameron, Bishopwearmouth; James W. Dees, Wallsend.

The days and places for the Field Meetings were fixed, as under:—

Wednesday, May 15...Coaly Hill, Walbottle, and Newburn.
Wednesday, June 12...Seaham and Hawthorn Dene.
Tuesday, July 16 .....Bellingham and Hesleyside.
Thursday, Aug. 15.....Alnwick (to meet the Berwickshire Naturalists' Club.)
Wednesday, Sept. 18...Staward Peel.
Friday, Oct. 18.....Marsden.

The following gentlemen were appointed office-bearers for the year 1861–2:—

President.

Frederick H. Johnson, Esq., M.D.

Vice-Presidents.

Rev. John F. Bigge, M.A.
Joshua Alder, Esq.
Edward Charlton, Esq., M.D.
Rev. Henry B. Tristram, M.A., F.L.S., &c.
Richard Howse, Esq.
Rev. Alfred Merle Norman, M.A.

Treasurer.

Robert Y. Green.

Secretaries.

Henry T. Mennell, Vincent R. Perkins } (*General.*)

SECRETARIES.

George S. Brady *(Sunderland.)*
Rev. W. T. Shields *(Hexham and North Tyne.)*

COMMITTEE.

Rev. Geo. C. Abbes, M.A.	W. L. Emmerson, M.D.
Dennis Embleton, M.D.	Thomas J. Bold.
Albany Hancock.	Henry B. Brady, F.L.S.
John Thompson.	Robert Vint.
John Hancock.	Arthur S. Donkin, M.D.
Joseph Blacklock.	Thomas Belt.

The following gentlemen were elected Honorary Members of the Club:—

Daniel Oliver, Jun., F.L.S., Professor of Botany in the University of London; T. Rupert Jones, Esq., F.G.S.; C. Spence Bate, Esq.; James Glaisher, Esq., F.R.S., &c.

The following rules of the Club, as amended and revised, were adopted, and ordered to be printed and distributed to the members:—

1. That the Society be called the TYNESIDE NATURALISTS' FIELD CLUB, and have for its object the practical study of Natural History, in all its branches, and that the Antiquaries of the district be invited to unite with the Club for the promotion of their pursuits through its meetings.

2. That the officers of the Club be a President, six Vice-Presidents, (one of whom, in the absence of the President, shall supply his place at the meetings), a Treasurer, two Secretaries, and local Secretaries, in such places as it may be thought desirable, who, with twelve other members of the Club, shall form a Committee.

3. That an Annual Meeting of the Club be held in Newcastle, not later than the month of March in each year, for the purpose of electing the officers for the ensuing years, auditing the accounts, selecting the places for the Field Meetings, and transacting any

other business which may be brought before it. The President of the preceding year shall also be requested to favour the members with an address at this meeting, containing a written summary of the proceedings at the several Field Meetings, together with such other observations from himself, as he may deem conducive to the welfare of the Club and the promotion of its objects.

4. That five or more Field Meetings be held during the year, in suitable localities, for investigating the Natural History and Antiquities of the district, selected and approved by the Annual Meeting, and that timely notice of each be given to the members by a circular from the Secretaries. That at each meeting the hour for a frugal dinner shall be appointed by the Chairman, after which any papers received from members of the Club shall be read from the chair.

5. That Evening Meetings be held at Newcastle during the winter months, at such time and place as the committee may appoint, for the purpose of reading and discussing such papers as there may not be time or opportunity properly to consider at the Field Meetings.

6. That all candidates for membership shall be proposed and seconded by existing members in writing at any meeting of the Club, and shall be elected by a majority of the votes of the members present.

7. That a subscription of five shillings yearly shall be paid by the members, to defray the cost of printing and illustrating the Transactions of the Club, and to meet any unavoidable outlay for stationery, postage, &c.

8. That the Secretaries be empowered to strike off the list any members whose subscriptions shall remain more than two years in arrear, after being applied to for payment by circular from the Secretaries or Collector.

9. That a class of honorary members be admissable, consisting of ladies and gentlemen, distinguished for their attainments in the study of Natural History or Antiquities, and to whom the Club may be indebted for the communication of papers or specimens.

10. That the Club shall undertake the formation of correct lists of the various natural productions of the counties of Northumberland and Durham, with such observations as their respective authors may deem necessary; as well as succinct accounts of the Geology of the district; and that, for fully carrying out this plan, the assistance and co-operation of parties studying Natural History in the North of England, whether members of the Club or not, be requested.

11. That for the purpose of thoroughly identifying the species referred to in the proposed lists, authentic local collections be formed and placed, with the consent of the Natural History Society, in the Newcastle Museum. The collections shall become the property of the Natural History Society, but the specimens in them shall be distinguished by some mark to show that they refer to the lists.

12. That these lists, the address of the President, and any other papers communicated to the Club which the committee may deem suitable for publication, shall be printed in a cheap octavo form, under the name of the "Transactions of the Tyneside Naturalists' Field Club," and distributed gratuitously to all the members whose subscriptions are not in arrear.

13. That the Club shall endeavour to discourage the practice of removing rare plants from the localities of which they are characteristic, and of risking the extermination of rare birds and other animals by wanton persecution; that the members be requested to use their influence with landowners and others, for the protection of the characteristic birds of the country, and to dispel the prejudices which are leading to their destruction; and that consequently the rarer botanical specimens collected at the Field Meetings be chiefly such as can be gathered without disturbing the roots of the plants; and that notes on the habits of birds be accumulated instead of specimens, by which our closet collections would be enriched only at the expense of nature's great museum out of doors. That in like manner the Club shall endeavour to cultivate a fuller knowledge of the local antiquities, historical, popular, and idiomatic, and to promote a taste for carefully preserving the monuments of the past from wanton injury.

THE TREASURER IN ACCOUNT WITH THE TYNESIDE NATURALISTS' FIELD CLUB, 1860—1861.

1860.	Dr.		
Feb. 1.—To Balance in hand	£22	17	0
1861.			
Feb. 1.—To 356 Subscriptions, at 5s	89	0	0
To Sale of "Transactions"	3	14	6
	£115	11	6

	Cr.		
By M. & M. W. Lambert, Printing "Transactions" (Vol. IV. Pts. III. & IV.)	£46	9	3
„ W. J. Palmer, Drawing and Engraving	8	17	0
„ Tuffen West, do.	8	8	0
„ T. Pigg & Co., Printing Circulars	6	10	6
„ J. G. Forster, do.	11	18	1
„ Half Expenses of Microscopical Soirée	2	3	0
„ Postage, Stationery, and Sundries	3	10	0
„ Collector's Commission	4	16	9
„ Balance in hand	22	18	11
	£115	11	6

Examined and found correct,

HENRY TURNER,
J. S. FORSTER, } Auditors.

II.—*Meteorological Report for* 1860. By Henry T. Mennell.

In presenting to the Club the Meteorological Report for 1860, it is again my pleasing duty to acknowledge the kindness of those gentlemen who have furnished the data upon which it is based. They are as follows:—

Allenheads.....Mr. Thos. J. Bewick, Lead Mines, Allenheads.
Bywell ..... Ditto.
Belford..... Mr. W. J. Hindmarsh.
Bishopwearmouth .....Dr. Ogden.
Cramlington.....Mr. Thomas Atthey.
Darlington ....Edward Pease, Esq., Southend.
Dunterley, nr. BellinghamMr. John T. Dixon.
Durham .....Mr. A. Marsh, Durham Observatory.
Howick Hall, the seat of Earl Grey ..... } Communicated by the Rev. J. F. Bigge.
Langleeford, Cheviot.....Mr. W. Henderson.
Lilburn Tower, near Alnwick, the seat of E. Collingwood, Esq. ..... } Communicated by the Rev. J. F. Bigge.
Newcastle .....Capt. C. O'Grady, R.E.
North Shields.....Mr. Robert Spence.
Rodham Hall, at the foot of the Cheviots, the seat of Wm. Rodham, Esq... } Communicated by the Rev. J. F. Bigge.
Rothbury .....Mr. T. Graham.
Seaham Harbour.....Mr. George Hodge.
Stamfordham .....Rev. J. F. Bigge, Stamfordham Rectory.
Sunderland .....Rev. Geo. Iliff, The Grange.
Washington ..... { Mr. J. Watson, F.R.A.S., Washington Chemical Works.
Whorlton, Teesdale .....T. Dodgson, Esq., Stubb House, near Whorlton.
Windyhaugh, Coquetdale..Mr. Thomas Chisholm.
Wylam ....G. C. Atkinson, Esq., Wylam Hall.

The return of the rain fall for 1860 will, I think, show that the clouds have faithfully *liquidated* the debt of rain which was due from them, and will also, I trust, remove all apprehension that our supply of water is likely seriously to diminish. Our record commences with a wet year, 1856, but it will be seen that the fall of 1860 very considerably exceeds that of 1856, and

a comparison with the dry years, 1857 and 1758, shows a still more remarkable result. The mean fall at 12 stations being 29·76 inches in 1856, 21·79 in 1858, and 33·99 in 1860.

The following remarks appended to the returns with which I have been favoured, will, I trust, be read with interest.

STAMFORDHAM.—We have indeed had a most dismal and gloomy year. Beans still *uncut* close to Dissington, a large field of oats still out at Nafferton, and, in the high country, a large quantity of oats uncut (January 19, 1861.) The following are the dates of the earliest flowering of plants, and the first appearance of birds and insects here in 1860:—Aconite, February 13; yellow crocus, February 25; coltsfoot, March 23; tortoiseshell butterfly, April 3; swallow, May 3; white butterfly, May 3; swift, May 21. In January, 1860, a flight of hawfinches was observed at Belsay, and a few shot; a scaup duck was also shot at Stamfordham.—*Rev. J. F. Bigge, January* 19, 1861.

WYLAM.—From the record of the maximum and minimum thermometers given below, it will be seen that one of the most remarkable facts of the year is that its temperature was between 2° and 3°, or 4·6 per cent. below the average.

THERMOMETER.

	Min.	Max.	Mean.
January	31·4	43·4	37·40.
February	27·6	40·5	34·05.
March	32·0	45·4	38·70.
April	33·3	49·7	41·50.
May	42·6	61·3	51·90·
June	45·8	61·5	53·65.
July	46·63	66·83	56·73.
August	46·1	63·5	54·80.
September	39·6	61·2	50·40.
October	40·5	55·5	48·00.
November	33·9	44·6	39·25.
December	27·0	37·84	32·42.
	37·20	52·60	44·9

The barometer in January fluctuated violently, especially on

the 21st and 23rd; and at the end of February made some curious dives. In March there was a good deal of fluctuation, tending gradually downwards towards the end of the month, when there was a good deal of rain. In April the glass gradually rose, and was succeeded by the only warm month of the year, May. In May the glass was pretty steady. June, I did not observe. July, August, September, October, November, and December, were all remarkable for a steady barometer.

I cannot close this paragraph without impressing on the Society the absolute necessity of publishing a diagram from time to time of the movements of the barometer, no figures can convey an idea of these to the mind, and a general simple view would be most instructive.—*George C. Atkinson, January* 9, 1861.

North Shields.—This return is the result of my new gauge placed upon the ground, and I understand approved, as to position, by Mr. Glaisher. The following are some of the most remarkable falls in the 24 hours, with the direction of the prevailing wind. January 26, ·512 of an inch, N.W. to S.E. wind; May 27, 1·387, N.W.; June 2, ·680, S.E.; July 23, ·970, S.W. to N.E.; October 15, ·825, S.W.; November 21, ·551, S.; December 9, ·560, S.E.—*Robert Spence.*

Sunderland.

THERMOMETER.

Maximum.		Minimum.	
January 2	55°	January 26	24°
February 26	51°	February 10	20°
March 18	55°	March 11	25°
April 8	58°	April 12	28°
May 5	70°	May 7	35°
June 28	66°	June 8	40°
July 5 (P.M.)	75°	July 5 (A.M.)	41°
August 19	69°	August 24	42°
September 4	65°	September 24	34°
October 6	66°	October 12	30°
November 2	56°	November 19	28°
December 1	48°	December 25	5°

The period from the 18th to 30th December is said to have been unparalleled for continuance of cold since the year 1813, and the thermometer was lower on the 25th, than it has been since February 1855.—*The Rev. George Iliff, The Grange.*

Middleton-in-Teesdale.—Another instance of the lateness of the harvest of last year may be noticed in the fact that Mr. William Alderson, farmer, Middles, a few miles from this town, was engaged last week in "stooking" a field of oats.—*Local Newspaper, March* 6, 1861.

Langleeford.—March 18, the first thaw this year.—May 29, Heavy fall of snow, preceded by thunder.—On the 27th June, thunder very prevalent this month.—October 14, Snow-storm; the snow has been off Cheviot just eleven weeks and four days.—*W. Henderson.*

Cramlington.—A gale of wind with a heavy fall of snow and rain visited this district between Sunday night and Monday morning, May 27 and 28.—*Thomas Atthey.*

Rothbury.—May 28, much snow, the hills are white; the storm preceded by heavy rain and thunder on the 26th.—June 14, very heavy fall of rain, Coquet much flooded. A great deal of thunder this month.—July 7, the comet visible between 10 and 10·30 p.m., in the N.N.W.—Oct. 13, snow; Oct. 14, frosty in the morning.—December 30, the long continued and severe frost yielded to the S.E. wind.—*Thomas Graham.*

Durham.—On Monday afternoon, July 23, in driving from Durham to Lanchester, we encountered a severe thunder-storm, accompanied with hail of extrordinary size, and so destructive to small animals, that within the space of a mile, we counted on the road six small birds, either killed or stunned by the violence of the hail.—*Rev. William T. Shields, Warden Vicarage.*

The above extracts leave me but little to remark; from them it will be seen that a snow-storm occurred over nearly the whole of our district on the 28th and 29th May, preceded by a thunder-storm and a falling barometer. This storm was very destructive to the grouse on our moors. Not only the eggs and young broods but great numbers of the old birds also were killed. During our visit to Teesdale, we observed numbers of nests with

the full complement of eggs, on which the mothers had perished as they sat.

Snow and frost recommenced throughout the district, about the 13th October, or about four and a half months after the storm in May.

Referring to the reports from Stamfordham and Middleton-in-Teesdale, which unhappily only detail the common experience of a large portion of the poor and exposed parts of our district, I am afraid that the old story of the two harvests in one year at Cleadon Lane, must cease to be related as a peculiar privilege of that favoured district.

On the 30th August, an unusually brilliant lunar rainbow was seen at Newcastle. It was visible with variable, but at times very considerable brilliancy for two hours. The night was fine and windy, with frequent slight showers from a perfectly clear sky.

In my last report I alluded to a project for the establishment of barometrical observatories at a number of stations in our coast. Since that time this has been succesfully accomplished—thanks to the munificence of the Duke of Northumberland, and the exertions of Messrs Sopwith and Glaisher.

In reply to some inquiries I recently made, with a view to this report, Mr. Sopwith says:--"The barometers and other instruments were all placed by Mr. Glaisher in September last, and have proved so far very useful; but the arrangements for registration have been deferred until the Spring, in order to complete proper schedules and instructions which are under way, and, in a short time, I hope to lay before the Club a full account of all that has been done." Mr. Glaisher also says in a letter on the same subject:—"It was very gratifying to find, before I had left the Northumberland coast, a week after fixing the barometers, that the lives of fully fifty men had been saved by them."

The practical utility of the establishment of these stations is therefore already proved, and I have no doubt that, when the observations are regularly registered, the scientific results will be no less important. I append below some additional particulars respecting the prevalence of certain winds at some of our stations. It will be seen that easterly winds (including E., S.E., and

N.E.) have been much more prevalent than in the three preceding years, this is especially the case in those months in which we find the largest number of days on which rain fell, and the greatest fall of rain, thus confirming the fact that our rain comes chiefly from the S.E. to E., especially near the coast:—

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
Langleeford	57	24	36	35	31	18	85	66
Seaham	47	45	25	39	37	54	99	20
Dunterley	20	49	63	36	9	22	111	54
Rothbury	4	48	56	49	2	68	80	51
Belford	24	28	27	94	12	79	29	56

It would add to the interest of this report if our correspondents would kindly record the dates of the commencement and termination of the more important farming operations in their vicinities, the earliest appearance of some of the more prominent spring flowers, the arrival and departure of birds of passage, and other facts of a similar nature which come under their daily observation.

MONTHLY REGISTER OF THE RAIN-FALL, IN INCHES WITH THE NUMBER OF DAYS ON WHICH RAIN FELL, & OF THE PREVAILING WINDS FOR 1859

	Tees.		Coquet.						Tyne.							
	Darlington.	Whorlton.	Rothbury.		Belford.		Rodham.		Langleeford, Cheviot.		Allenheads.		Dunterley, near Bellingham.		Stamfordham.		Bywell.	
Elevation above sea-level in ft.	135	450	280		209		510		....		1,360		401		380		74	
	Quantity	Quantity	W.	Wind.	W.	Wind.	Quantity	W.	W.	Wind.	Quantity.	W.	W.	Wind.	Quantity.	W.	Quantity	W.
January	2·55	1·74	24	NE,W,NW	26	SW	8·28	22	18	N, W, SE	9·914	27	20	E, W, NW	4·48	17	4·40	21
February....	1·99	0·86	19	NW, SW, NE	16	NW	2·63	13	18	NW, N	5·186	25	17	NW, W	2·08	13	2·15	21
March	2·39	2·59	25	NW, SW	21	SW, NW	2·04	22	22	NW	4·986	27	23	W, NW	2·12	24	2·98	25
April	·77	1·16	19	NE, E	18	NW	0·61	7	16	NW	3·114	22	17	NW,E, NE	1·24	13	1 53	19
May.....	4·19	1·81	14	W,SW, SE	20	E	1·34	8	12	S, W	3·167	23	15	W, E	1·51	15	2·64	16
June	2·82	5·78	24	SE, SW	12	SE, SW	4·56	20	24	S, W, E	6·257	27	20	E, SW	5·06	20	4·39	24
July.....	3 76	2·07	17	W, E, SE	15	SW, SE	4·40	16	17	N, NW SE	3·198	19	17	E, W, NW	3·81	12	3·54	15
August.....	3·61	3·78	30	W	20	SE	2·88	23	26	W	4·931	25	24	W, NE	2·40	19	3·03	25
September..	1·19	1·35	23	E, W, SW	8	W, NW	2·47	10	13	W, N	1·872	19	14	W	1·30	10	1·79	20
October	2·00	2·07	24	W, SW	25	SE, SW	2·72	21	21	W, N	6·246	29	24	W	2·93	15	3·29	22
November ..	2·09	2·87	28	E, SW	29	SW	5·26	27	23	E, N	4·757	27	26	NE, E	4·44	16	3·55	26
December ..	4·50	4·20	26	E,NW,NE	25	SE, NE	4·81	22	26	N, E, SE	5·525	27	22	SE, NW	4·09	18	4·71	25
Total, 1860..	31·86	30·28	273	W, SW	235	SE, SW	42·00	211	236	W, N, NW	59·153	297	239	W, E, NW	35·26	211	38·00	259
Total, 1859..	27·65	26·74	200	W, NW, E	147	NW, SW	31·87	..	188	W	47·708	259	190	W, E	27·85	211	27·34	182
Total, 1858..	..	21·56	183	W, NW, E	141	SW, W	23·11	..	172	W, NW	37·210	229	172	W, E	27·19	..	21·88	165
Total, 1857..	..	23·93	..	..	..	..	28·79	..	..	..	41·798	..	..	..	28·86	..	27·55	..
Total, 1856..	..	27·30	..	..	..	..	41·69	..	..	..	45·484	..	..	..	35·06	..	29·82	..

	Tyne.		Coast.						Wear.					
	Wylam.	Cramlington.	Newcastle.		North Shields.		Howick.	Seaham Harbonr.		Sunderland.			Washington.	Durham.	
Elevation above sea-level in ft.	80	263	187		....		80	....		130			120	339	
	Quantity.	W.	Quantity.	Wind.	Quantity.	W.	Quantity.	W.	Wind.	Quantity.	W.	Wind.	Quantity	Quantity.	W.
January	4·10	22	3·59	S, W	3·452	27	4·42	24	W	2·81	10	..	3·24	3·31	18
February ...	1·77	18	1·04	W	1·532	20	1·15	15	W, N	1·12	9	..	1·26	1·46	9
March.....	2·19	24	1·35	W, S	1·928	24	2·08	11	W, NW	1·35	7	..	1·02	1·66	13
April	0 97	17	0·98	N	1·131	23	0·55	14	NE	0·37	15	..	0·85	0·62	10
May	2·21	16	2·30	N, W	3·198	21	1·76	16	S, SW, W	1·97	8	..	2·20	2·33	13
June	3 58	21	3·12	N, W	2·656	22	1·11	20	SW, SE, S	2·55	12	..	3·86	3·97	17
July	2·71	17	2·67	N, E	2·949	20	2·55	13	SW, SE	2·94	11	..	2·94	3·17	12
August.....	2·13	23	2·39	W,SE,W	2·836	28	3·04	20	W, SW	2·24	12	..	2·33	2·73	23
September ..	1·11	14	1·09	W, N	1·883	25	2·55	17	W	2·44	11	..	1·87	1·61	13
October	3·02	20	2·31	W, S	2·236	27	1·90	16	W, NE	1·50	13	..	1·80	1·92	22
November ..	3·06	25	2·88	NE, S	3·403	24	4·24	21	E, NE,	2·44	16	..	2·70	2·79	23
December...	4·53	25	3·68	S, W	4·982	29	2·13	27	SE, N	2·48	21	..	3·54	4·76	24
Total, 1860..	31·38	242	27·40	W	32·186	290	27·48	214	W, SW	24·71	145	..	27·61	30·33	197
Total, 1859..	25·15	170	18·41	W	..	171	18·84	171	SW, W	17·19	111	SW, NW SE	20·68	21·57	..
Total, 1858..	18·20	156	13·29	W, SW	..	172	22·51	172	SW, W	17·87	119	SW, NW SE	15·75	18·73	..
Total, 1857..	24·47	..	16·43	..	..	..	20·77	..	..	18·93	..	..	19·61	26·55	..
Total, 1856..	29·25	..	21·23	..	..	..	22·58	..	..	18·12	..	..	26·00	29·65	..

III.—*Table of the Rain Fall in the Vale of the Tyne.* *By* Geo. C. Atkinson, Esq.

DIAGRAM OF MONTHLY RAIN FOR SIXTEEN YEARS, (FROM PRECEDING TABLE).

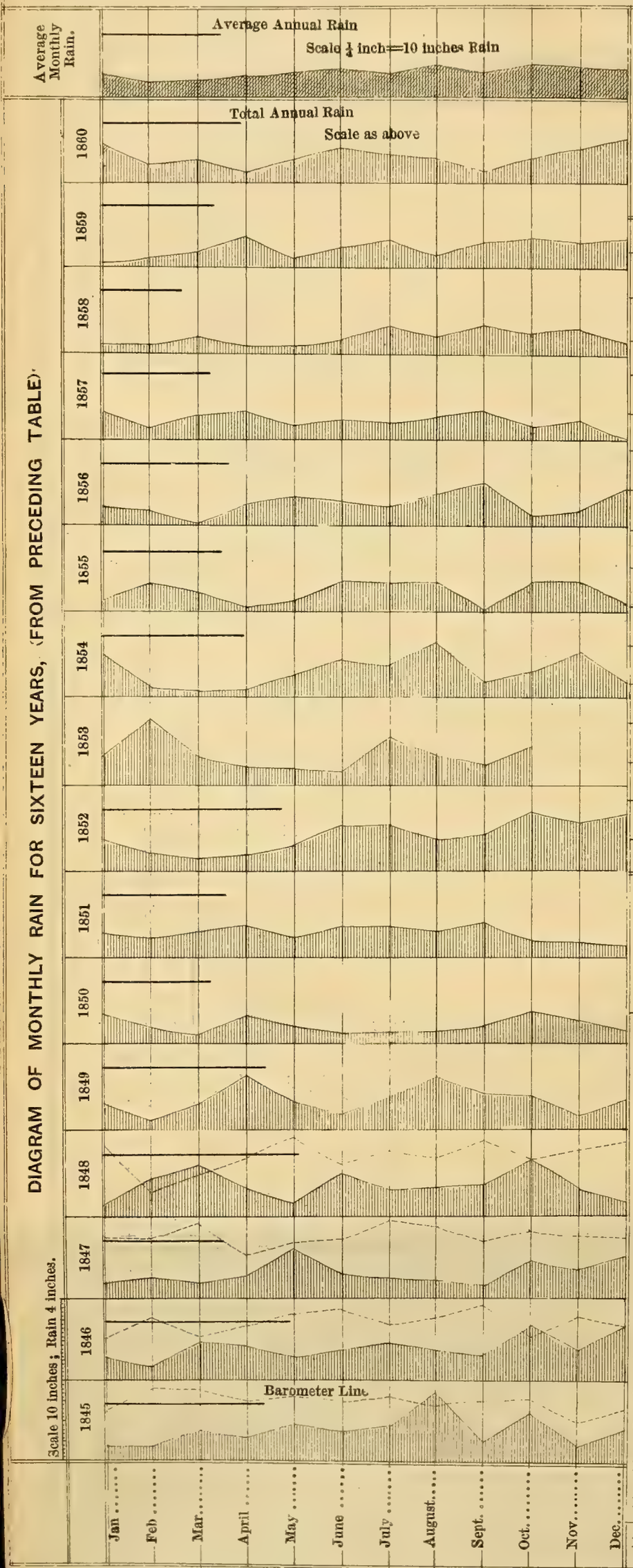
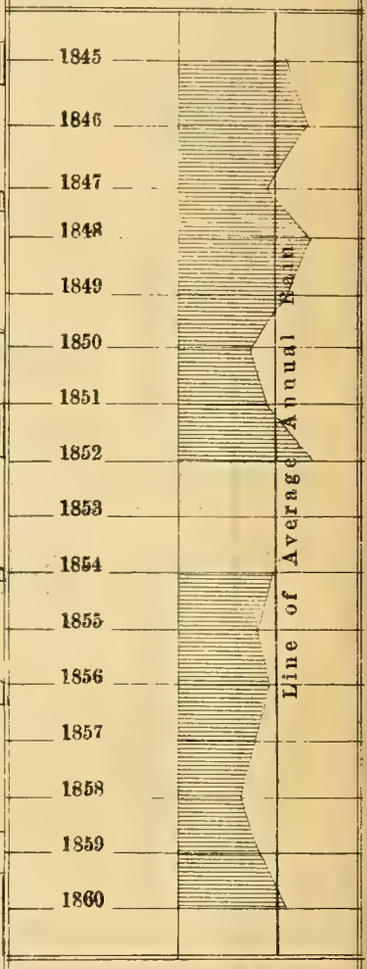


DIAGRAM
OF
ANNUAL RAIN
FOR 16 YEARS.
SCALE 5 inch=40 inches.



MONTHLY MEAN HEIGHT
OF BAROMETER
AT
LIT. AND PHIL. SOC., NEWCASTLE.
CORRECTED TO 32°

	1845	1846	1847	1848
Jan.	29,611	29,547	29,748	29,834
Feb.	29,801	29,751	29,738	29,338
Mar.	29,863	29,530	29,863	29,446
Ap.	29,728	29,630	29,892	29,618
May	29,735	29,761	29,707	29,897
Jun	29,715	29,827	29,775	29,607
July	29,744	29,680	29,907	29,734
Aug.	29,673	29,776	29,849	29,650
Sep.	29,736	29,836	29,719	29,816
Oct.	29,771	29,449	29,769	29,659
Nov.	29,490	29,779	29,742	29,694
Dec.	29,517	29,703	29,625	29,712
Mn.	29,703	29,689	29,753	29,667

TABLE OF RAIN IN THE VALLEY OF THE TYNE, FROM 1845 TO 1860, BOTH INCLUDED.

	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	Average Monthly Rain.
January	1·15	2·16	1·43	1·05	2·68	3·48	2·50	2·45	2·69	3·65	1·27	1·67	2·54	0·46	0·63	4·10	2·12
February ...	1·22	1·01	1·71	4·86	0·50	1·43	1·90	1·10	7·54	0·39	2·61	1·55	1·15	0·51	0·75	1·77	1·88
March	3·35	4·06	1·27	5·83	2·08	0·66	2·72	0·60	2·47	0·29	2·02	0·14	2·48	0·80	1·95	2·19	2·05
April	2·32	3·97	2·08	2·54	5·96	2·84	3·07	1·02	1·74	0·52	0·22	2·27	2·82	0·61	3·16	0·97	2·26
May.....	4·33	2·43	6·22	1·52	2·81	1·99	1·79	2·53	1·55	2·18	1·35	3·37	1·39	0·79	0·27	2·21	2·30
June.....	2·64	3·16	2·09	5·37	1·10	1·45	3·07	4·98	1·34	4·00	3·85	2·90	2·27	1·60	2·01	3·58	2·84
July	3·19	3·56	1·72	2·74	3·36	1·45	3·26	4·71	5·53	3·29	3·70	1·71	1·43	3·40	3·00	2·71	3·05
August.....	7·60	2·96	1·65	3·13	5·80	1·89	2·91	3·32	2·40	6·82	3·60	3·85	2·90	1·94	1·80	2·13	3·42
September ..	1·66	2·18	1·34	2·94	4·08	2·12	3 58	4·18	1·70	0·52	0·31	4·83	3·22	2·91	2·63	1·11	2·45
October	5·85	6·33	3·62	6·31	3·67	3·97	1·45	6·50	4·38	2·53	3·89	1·03	1·56	1·66	3·36	3·02	3·69
November ..	1·60	2·77	2·91	2·68	1·26	2·34	1·40	5·31	Previous to this, at West Denton, afterwards at Wylam.	5 16	2·73	1·42	2·29	2·12	2·64	3·06	2·64
December ...	2·99	5·67	3·81	1·39	2·92	0·58	0·39	6·14		1·75	1·05	4·51	0·42	1·40	2·95	4·53	2 70
Total	37·88	40·26	29·85	40·36	36·22	24·20	28·04	42·84		31·10	26·60	29·25	24·47	18·20	25·15	31·38	

The Rain Gauge is a Zinc Funnel, 10 inches square, standing about 4 inches above the ground.

At West Denton, 250 above the Sea.

At Wylam, 96 above the Sea.

Average Rain, 31·05 — 15)46·580

TOTAL ANNUAL RAIN FOR SIXTEEN YEARS.	
1845	37·88
1846	40·26
1847	29 85
1848	40·36
1849	36·22
1850	24·20
1851	28 04
1852	42·84
1853	....
1854	31·10
1855	26·60
1856	29·25
1857	24·47
1858	18·20
1859	25·15
1860	31·38

IV.—*On Certain Changes in the Plumage of the Pheasant.* By the Right Hon. Lord Ravensworth.

A good deal has been previously written on those singular changes of plumage which are remarked in old specimens of females among the pheasant and other gallinaceous tribes, attributable in ordinary cases to the effect of age, sterility, or other changes of constitution. In two instances within my experience a female of the wild breed of Duck *(Anas Boschas)* has assumed the plumage of the drake, one of which specimens will probably be exhibited to the Naturalists' Club on the occasion of this paper being read. Both these examples were known to be birds of considerable age. I shall not dwell longer upon these phenomena in the case of females, further than to state that I have sometimes, though rarely, observed in female pheasants where *no change of plumage* had occurred, another attribute of the male sex in the appearance of spurs. These are always short, and more commonly are found only on one leg; but they are strong, and sharp. A specimen shot last week of the hen pheasant, with the spur on both legs, is now in the hands of Duncan for preservation. These instances are more rare than that change of plumage which constitutes what is generally called by sportsmen "a Mule Bird."

But besides these cases, I have recently noticed in many instances a change in the plumage of the *male* pheasant, which (as far as I know) has never yet been described by Naturalists. This change is the converse of the former. In these cases the cock bird partially acquires the plumage of the hen. In a very peculiar example now before me, which was shot here some twelve or fourteen years ago, the scapular feathers, the wing coverts, and the whole wing, the tail coverts, and the tail itself, precisely resemble the female, and exhibit none of those brilliant colours and distinctive markings with which we are all familiar in the matured plumage of the cock pheasant. The plumage also of the belly is pale and flushed with grey feathers. The bird, however, was killed at the end of the winter, when the plumage is in the highest order. It was quite alone, and at a distance from any of the

coverts, as if it had been banished from society. Singular to relate, its very spurs partake of the character of the female, resembling rather those of an old domestic hen than the true attributes of the cock pheasant.

It is a bird of great size, with a large allowance of the bare red skin round the eyes, a distinction which in no case is ever observed in the female even where, in all other respects, her plumage has become that of the male.

The description given of this individual specimen may be received as common to all these "Androgynous" mutations, of which a great number have presented themselves to my notice in turning out the bags of the present season, in which scarcely any young birds escaped the disastrous storms of cold rain during the last summer. Every one of the more recent specimens were evidently birds of great age, and, unlike the example described, they all possessed very long and sharp spurs. Several gradations of plumage were observed, some partaking more, others less, of the female character.

Ravensworth Castle, 28th January, 1861.

V.—*Notice of the Breeding of the Tufted Duck* (Anas fuligula) *in Northumberland.* By John Hancock.

In the year 1858, Sir Walter C. Trevelyan, Bart., informed me, that a small duck had reared its brood, consisting of eight or nine, on a pond near his house at Wallington. Sir Walter again informed me, in the early part of the following year, that the same sort of small duck which had bred at Wallington the previous year, was on the pond again. During May of the same year, I paid a visit to Wallington, and immediately on my arrival, I strolled down to the pond to ascertain if possible what species of duck it was. I was not there many minutes, before I observed two small ducks on the water at the far side of the pond. With the aid of a small telescope, I soon discovered that they

were Tufted Ducks. The male was in full plumage; he carried his flank feathers quite over the wing, which gave him a very odd appearance; in fact, the white almost met over the back. It was clear that they were also breeding this year, for they would not leave the water unless driven from it.

I remained at Wallington from the 24th of May till the morning of the 28th, and during that time made many searches to find the nest, but without success. I had the satisfaction, in company with Sir Walter, and Mr. Wooster, of observing the birds each day. The pond is surrounded with high trees, and between the trees and the water's edge there are clumps of Rhododendrons and other evergreens.

At day-break of the 28th, Mr. Wooster and I visited the pond for a final search before I left. We thought by going early we should surprise the duck on the eggs, if she were sitting. We were disappointed, however, to observe her swimming about, as usual, with her mate, and were therefore perfectly satisfied that she had not yet commenced to sit; I left, however, quite assured I should soon have the satisfaction of hearing from Wallington that the nest had been found, as it was evident, from the limited nature of the locality, it must be ultimately discovered. Accordingly, on the 21st of June, I received a letter from Sir Walter, stating that the Tufted Duck's nest had been found, and I cannot do better than quote the letter, which is as follows:—"I will to-morrow send you, by carrier, an egg of the Tufted Duck, whose nest we have at last found, with *nine eggs* in it; it is among sedges and willows made of sedges, and a slight lining of down. The male disappeared about a fortnight ago, and left his mate to bring up her family alone, as she did last year, when he was never seen, and I hope she will succeed as well this season, and that we may look for more of the family to breed with us another year."

I had afterwards the satisfaction of seeing the nest—it was placed on a small island, near the middle of the pond.

Last year (1860) three made their appearance on the same piece of water—one male and two females. I was at Wallington from the 17th to the 19th of May, and saw them all three, but could not find the nest.

This is not the first account given of the Tufted Duck breeding in England. In the "Zoologist" for 1850, at p. 2,879, is a notice of a brood in Yorkshire; and in the same publication for 1854 there is also an account of the birds nesting at Osberton, in Nottinghamshire.

My friend, Mr. Alfred Newton, of Elveden, says in a letter which I had the pleasure of receiving from him, that "in 1851 my brother Edward and myself were staying with our cousin, Lord Galway, at his place in Nottinghamshire, and the bailiff, a most intelligent man, told us of a pair of Tufted Ducks which, for the last two or three years, had frequented the water there (at Serlby), and hatched their young on an island."

Thus it appears we have four well-authenticated instances of the Tufted Duck breeding in England.

VI.—*On the Common Brittle Star* (Ophiocoma rosula), *with some Remarks on the Growth of the Rays and their Appendages.* Pl. 1.

During the early part of 1860 I obtained a minute Star-fish from a sac of *Grantia compressa*. This star, from presenting some peculiar points of structure, was carefully examined and permanently mounted for the microscope. The most striking features were the shortness of the rays and the presence of strong claws or hooks upon each.

These appendages are of very unfrequent occurrence in adult forms; and from my specimen having four upon each ray, it was inferred that it might be an undescribed species; Pl. I., fig. 1, will give an idea of its general form and peculiarities. Size, $\frac{1}{30}$ of an inch; colour, disc, orange—rays, nearly white.

Since then, as opportunities occurred, other specimens were sought for, but until the last few weeks I was unsuccessful in finding any at all like it; however, through the obliging disposition of a Seaham fisherman, I have had large quantities of zoophytes sponges, &c., brought to me from his fishing lines, and obtained

in 13 to 23 fathoms water. Upon the sponges I seldom fail to detect one or more specimens of these minute Star-fish; as many as a dozen of various sizes, agreeing in general form, being frequently clustered upon a fragment not more than an inch or so long. I have thus had abundance of material, and have obtained them from the small size mentioned above, to the ordinary size of this Brittle Star—a regular and progressive increase, from the thirtieth of an inch to six or seven inches across.

From a series of mountings, I have been enabled to trace, step by step, the gradual changes in the character and form of the spines, plates, and appendages of the animal generally.

As there are some peculiar circumstances connected with the development of these several organs which are not generally known, it may not be out of place to put on record such observations as I have been enabled to make.

Every one that resorts to the sea-side must be perfectly familiar with the common Brittle Star *(Ophiocoma rosula)*, and doubtless many of our members have often sought for perfect specimens amongst the fishermen's lines at Cullercoats, and other places generally visited during the summer season; and many a time they may have been disappointed, on picking up a good specimen, to find, while holding it, that it suddenly divests itself of its rays; and, as bit by bit breaks up into still smaller fragments, nothing is finally left but a collection of long sharp spines, attached to the ray scales, and the forsaken disc—projecting from which are irregular spokes, in place of the long tapering rays. But if, instead of handling, the would-be possessor of a perfect specimen provides a vessel of cold fresh water (not sea water), and without fingering the specimen, he plunges or drops it quickly therein, the fresh water bath will be found to cause so violent a shock to the Star-fish as to deprive it of the power of throwing off its rays—being completely paralyzed by contact with a fluid fatal to marine life—and the experimenter will have the satisfaction of obtaining a perfect specimen, which only needs careful drying to form a desirable addition to the cabinet.

Having so obtained a large specimen, let it be carefully examined, and the form and arrangement of the rays duly noted,

and after such examination, let Fig. 1 (of the minute form before alluded to) be compared with it, and it will be seen that there is not the least resemblance between them further than that each is a Star-fish possessed of five-rays; that in the large form the spines are long and pointed; in the small, fan-shaped, flat, and spreading: how, then, can these flat forms ever merge into the long and pointed? Such thoughts as these suggested themselves to my mind as I endeavoured to account for the difference when first the subject was taken up, feeling almost certain that my specimen had something to do with the common Brittle Star; other specimens, and more time spent in their consideration, solved the problem, and it will now be requisite to confine ourselves to a careful consideration of some of the changes that a form similar to Fig. 1 goes through, before appearing as a perfect and fully developed individual, similar to the Brittle Star, supposed to have been obtained from the fishing lines.

Premising, therefore, that the earliest form of a Star-fish is "an oval, ciliated body, like an infusory animalcule, without organs or distinction of parts,"* and that it passes through various changes before partaking of the radiate form and character of the class, for full particulars of which I must refer my readers to the admirable researches of Müller and Sars in the "Annals."

It will be sufficient for my purpose if we take up the subject where these Naturalists appear to have left it, and assume that the animal under consideration is, in its young state (or that immediately preceding its assumption of the distinctive features of its class) a little radiate star, the arms or rays being represented by short warts or lobes standing out from the disc.†

The first segment is produced from the lobes, before alluded to, and these assume the form and character of segments by the

* See T. H. Huxley, Annals, and Mag. Nat. History, July, 1851.

† The smallest and most immature form of *Ophiocoma rosula* that I have obtained shows four flat fanshaped spines on the first ray joint, or that nearest the disc: two claws or hooks, and two small narrow spines (just forming) on the second joint; and beyond these, the tip hooks and small lobes in a very early stage. From this it will be seen, that the first segment or joint produces flat fan-shaped spines in the first instance, whereas the second joint deviates from this, and first forms claws.

gradual secretion of joints, plates, and spines; to the two former I need not here allude.

From each side of the first-mentioned lobes are produced little warts or protuberances which give origin to four flat fan-shaped radiating spines, standing out on each side (see Fig. 1). The next segment is at first much the same, as far as the plates and fleshy portions are concerned, but not so the spines, for in this case the lateral shoots produce two claws, at first nearly straight, but as they increase in size, they gradually assume a clawed form, much bent inwards, and having, in addition to the curve at the apex, one, and sometimes two, hooks between the tip and base.

While these claws are being formed, the lobes from whence they are produced are pushing out between them in a straight line a fleshy prolongation, which secretes a long plate on its upper surface, and various others imbedded in its substance,* and at the same time sends out two small warts at the base of the claws, which in this early stage of the life of the Star-fish, each produce two broad radiating spines to a certain extent like those first formed.

This latter order of development is repeated again—once, or even twice, the only difference being, that in the subsequent productions the flat radiating spines gradually give place to others of a more pointed character.

The "Star" being now possessed of three or four joints to each ray, puts out another, and with it its customary lobes; these as usual secrete the claws and spines, but now and henceforth the spines are in each case long, jagged, and pointed—no more of a flat radiating character being seen; and this goes on, joint after joint being added, the lobes secreting perforated plates, at first slightly oval, irregular and removed from each other, but as they increase in size, they gradually approach and assume the shape seen in mature specimens.

If we take a moderately large Brittle Star and carefully examine it near the disc, it will be seen that the spines are long and pointed, and set in rows upon the rays from the upper to the

* These plates are at first more like a coarse net, but as they increase in size, the interspaces are much filled up, and produce a closer texture.

under side; but where are the flat spines and claws as seen in a young form?—none are visible; examine every large specimen that you can obtain, and this will be found to hold good.

It would therefore appear, that the claws are formed to assist the young animal in attaching itself to various bodies on which it is found, and also for the purpose of locomotion: this can easily be understood; but why the flat form of spines should in the first two or three instances precede the regular form, I am unable to say: the extraordinary part being, that these flat forms are only produced in early growth, and not (as far as I have seen in the many specimens examined), when the rays begin to lengthen; the long form being the only kind then met with—still, however, preceded by the claws.

This is shown at Fig. 3, a portion of a ray—the extremity only being shown: the claws here greatly preponderate in size over the spines, which are just appearing.

This also holds good in the case of reproduced rays—an example may be cited. A Brittle Star now before me, measuring $3\frac{1}{2}$ inches from tip to tip, has a small ray, only half an inch long, about half of which is old, the remainder being of much smaller dimensions, and in course of reproduction: the latter is seen to possess claws, and the long jagged spines of small size along the newly-produced part; but not a sign of a claw upon the old portion; even the first two joints of the new are also without them.

Sars alludes to the temporary acquisition of organs to be subsequently dispensed with, as others more in character with the animal are produced, when he says, in speaking of the developmental part of their history, "Furthermore parts are developed, for instance the above-mentioned organs of attachment, which are destined only for immature age, and therefore disappear entirely as the animal approaches to maturity. The reason for the disappearance of the organs of attachment depends upon their becoming utterly useless, on account of the development of tentacles with which the young star-fish begins a new method of locomotion, and enters into other relations with the external world."*

* On the development of Star-fishes by M. Sars in Annals and Mag. Nat. History.—Oct., 1844.

So in the present case, the hooks disappeared when the rays furnished with long spines are matured, and the flat fan-shaped spines are doubtless modified by further deposits, so as to assume the mature form.

I have just said "the hooks disappear," but how is this accomplished? Here was a difficulty that beset me, and well nigh remained unsolved. Luckily I boiled a moderate-sized specimen in liquid potash, to procure some "hooks," from which to make the necessary sketches, and by this means, I obtained a plentiful supply, and at the same time ascertained, to my complete satisfaction, the reason of the claws not being present in mature specimens. This is so extremely interesting, that I have figured some of the most striking features, and can best explain the process in conjunction with these figures.

Figs. 5 and 6 represent two fully formed and perfect hooks, the former having one fang (in addition to the tip) and the latter two; this form may be taken as the most perfect stage of the organ as a hook.

If Fig. 7 is now examined, it will be seen that there are irregular little notches on the upper outer margin, still more decided in Fig. 9, this specimen having lost much of the character of a hook.

Fig. 8 shows the peculiar "set" of the deposit in growth; which by means of a considerable increase of calcareous material at one particular part, shows the commencement of a longitudinal growth, eventually producing a deposit of a spinous character.

In Fig. 10 the character of a hook is changed, a stumpy spine being the result of a successive growth, both from the base, and also by an irregular deposit at the margins.

In Figs. 11 and 12 (still further growths) the distinctive characters of the hooks are just visible; these figures may be considered representations of regular spines, "long and jagged."

These specimens are of peculiar interest, in proving that the growth of these organs, is not only by means of a gradual deposit of calcareous material on their external surfaces, but also, by a regular "growth" from the base. If this were not the case, the tip of the hooks would be left far down, or near the base, and would not be carried or pushed forward. That this is so

I am fully satisfied from a most careful examination of a large number of spines, in all stages of growth.

The peculiar circumstance of one side of the spine having much larger "teeth" than the other, is also worthy of attention; and it would appear that the side passing the larger teeth is that which in the early or hooked stage possessed the fangs, as shown at Fig. 6.

The subject of the growth of these calcareous structures is one of great interest, and when the various parts of the Echinodermata are microscopically examined, our admiration and wonder are excited by observing the singular modification which they undergo, many of them very difficult to understand. As from the extremely small proportion of fleshy matter that these structures contain, we are led to expect, that the solid or calcareous portion when once formed, must henceforth retain (within certain limits) the shape and distinctive features of the original mould. But that this is not the case, the foregoing will already show, and I doubt not there are many other phases in the growth of the organs and parts of this interesting class that would well repay careful study.*

The gradual development of the plates on the disc presents some interesting features difficult to understand from the great variety of forms met with, no two specimens fully agreeing with each other in the shape of the plates clothing the disc. The general principle and features may however thus be stated. The central surface of the disc in early stages is furnished with a transparent membrane of a calcareous nature, at first thin and devoid of perforations, which however soon appear, and are generally arranged in rows, forming between them five divisions. The central plate or membrane then thickens and breaks up into six scales, five being ranged round the central portion, the lines of fracture having been determined by the small perforations. The last formed scales now rapidly assume the features of those on the outer margin, which in all probability were also formed

* I may here remark that the possession of hooks in an early stage, to be afterwards transformed into spines, is not confined to the species under consideration: a young specimen of the Daisy Brittle Star (*Ophiocoma bellis*) in my possession, shows the hooked forms in all stages, in a marked and most interesting manner; and it seems highly probable that other species of similar character will be much the same.

in the same manner, and have (subsequently to their formation) been gradually augmented in dimensions by the deposition of substance on their margins.

Gosse in his "Tenby" gives a very clear and ingenious idea as to the growth of similar organs in the Echinus; his opinion is, that the points or teeth seen in so many of the parts of these animals are increased by a deposit, and meeting, they coalesce, and thus extend the size of the plate or other part, at the same time forming the perforations so frequently met with.

This would only hold when the plates or the like are surrounded by, or contiguous with, a substance capable of secreting and depositing the lime.

It now only remains for me to give a description of the figures accompanying this paper.

Plate I.—Fig. 1 gives a general view of a form of disc frequently met with; were the various appearances that may be noticed, figured, they would only tend to confuse.

Fig. 2 shows a large specimen with the plates on the ray-joints, and gives a general idea of the gradual assumption of the pointed form of spines. This figure also shows the mouth, with the five converging teeth meeting in the centre, together with the arrangement of the irregular plates, round the margin of the disc.

Fig. 3. Tip of moderately large ray, the claws of which have been rapidly formed before the spines, which are just appearing from the base of the claws. This appearance is frequently seen in slender specimens, and appears to be the result of a rapid longitudinal growth.

Fig. 4. Early form of flat fan-shaped spine, showing the assumption of features causing it to possess more of the character of a regular spine.

Figs. 5 to 12. Successive stages of the hooks, showing the changes from hooks to spines.

Figs. 13 and 14. Two three-pronged spines from the scale plates upon upper surface of disc; these cause the rough spinous processes seen in mature forms.

Note.—Figs 1, 3, 4, 5, 6, 7, 8, 9, 10, 11 12, are all magnified 100 diameters. Fig. 2 is magnified 75 diameters. Figs. 13 and 14 are magnified 200 diameters.

VII.—*On a Spider (Neriene errans) inhabiting Coal Mines.* By David P. Morison, Pelton Colliery.

During the commencement of last year my attention was directed to the immense sheets of web-like material which abound in the "waste" or old workings of the Pelton Colliery. These webs attain a most gigantic size, some of them having been seen upwards of twenty or thirty feet in length, by four or five in height, and some even more, and they all, in consequence of the coal dust with which they are densely covered, present an opaque blackish appearance.

I was informed that they had generally been considered to be the mycelium of a fungus, but not feeling at all convinced of this, I determined to subject them to a more rigid examination than they had yet received. For this purpose, on Feburary, 1860, I descended the pit with two of the wastemen, from whom I learned *en route*, and soon afterwards ascertained from actual experience, that, however interesting a subject they might be to the naturalist, they formed most disagreeable impediments to the progress of any one passing through them; these men also assured me that they were, in their opinion, not *fungi*, but most certainly spiders webs, and that furthermore they had often seen minute spiders engaged in spinning them.

This fact was completely verified on our arriving at the *locale* where the webs were the most plentiful, as I at once detected on them scores of small spiders, some busily occupied in the fabrication of the webs, and others rapidly dropping to the ground on our approach. By subsequent and more extended observations, I remarked that these insects are eminently gregarious, assembling in large numbers to construct fresh webs, or to repair any rents or damages in the older ones; and also that their continual abode in the total darkness of the coal-pit, does not seem to have deprived them of their susceptibility to light, as on the approach, of the lamps, they may be seen scampering about in great agitation, and dropping from their webs to the floor of the galleries.

Would it not be an interesting problem to solve whether, after the total absence of light for several generations, as it must frequently happen, their eyes still retain the same faculty of transmitting the image of objects to the retina, as they possessed before their conversion into *miners;* or whether their apparent commotion derives its origin from some other sense than that of sight?

But, *pour revenir á nos moutons*, I *boxed* two or three specimens that night, one of which I sent next day through post to Mr. H. T. Stainton, Mountsfield, Lewisham, who, I may perhaps here be allowed to say, deserves the warmest thanks of every entomologist, tyro or adept, for the readiness and kindness with which he invariably renders assistance to all engaged in that science, requesting him to let me know if it was a common spider, as I was not an arachnologist myself; by him it was forwarded to Mr. R. H. Meade, F. R. S., Bradford. In reply to Mr. Stainton, that gentleman wrote, that, owing to the dried up and shrivelled condition of the specimen, it was impossible for him to determine more than the generic name *(neriene)*; he also added that it seemed improbable that so small a spider could construct such large masses of web, supposing them to be the production of a spider at all, but which question might easily be settled by microscopical examination.

I procured other living specimens, and a small portion of the web, which I forwarded direct to Mr. Meade, at the same time acquainting him with the facts I had then noticed in reference to the spiders, and my reasons for believing the webs to be of their construction; to which he kindly replied, that the only specimen which had reached him alive resembled very closely one named *Neriene errans*, adding, "There is no doubt about the web being the genuine production of spiders, and it contains numerous scales from the wings of small moths entangled between its fibres." Another larger portion was also decided by him to be genuine spiders' web, and other specimens established the identity of the insect with *N. errans.**

* Mr. Meade has obliged me with the following description :—

Neriene errans, var. subterranea. Cephalo-thorace appendicibus brunneis, nisi in pedibus palpisque pallide rufo-brunneis ; abdomine obscure viridescenti-brunneo serie mediana obscura linearum angularium flavescenti-brunnea—Long. $\frac{1}{5}$th of an inch.

Mr. P. S. Reid, of Pelton Colliery, kindly forwarded another piece of the web to Mr. Hunt, of the Mining Record Office, London, who submitted it to Mr. Berkeley, by whom it was likewise pronounced the production of spiders.

It may be not uninteresting to give a few details of the coal-mine in which this spider was discovered, and I therefore subjoin them:—The seam of coal which is at present being worked, and in which it was found, is called the *Hutton Seam*, and is here, at Pelton Colliery, about 4 feet and a half thick, and 320 below the surface of the ground. The temperature, especially in the *waste*, where the webs abound, stands considerably higher than on the surface. About 75 horses and ponies are employed and stabled in the pit, and it is doubtless the flies, &c., conveyed down in the fodder upon which the spiders subsist; of these small flies there seems to be an immense number, but although I have repeatedly sought for the *Tineina* reputed to feed on the *fungi* sprouting from the decayed props, the existence of which in this colliery would seem to be proved by the scales found by Mr. Meade in the webs, I have never yet seen a single individual of that tribe.

I conclude this somewhat lengthy notice of this very interesting insect, by an extract from a recent paper by Mr. Meade,* in which the facts connected with this spider are most ably embodied:—

"It is an exceedingly interesting fact that a minute spider, ordinarily living in the open fields, should find its way to such a depth beneath the surface of the ground, and multiply to such an extent as to be able to construct, by the united labours of hundreds, immense sheets of web, stretching through all the deserted subterranean galleries. It seems that this little creature at the

Cephalo-thorax pale dirty brown, eyes small, legs, and palpi pale reddish or brownish yellow; first and fourth pair of legs, which are the longest, equal in length, third pair the shortest, abdomen oviform, rather convex above, projecting over the base of the cephalo-thorax; it is thinly covered with hair, glossy, of a blackish brown colour, sometimes tinged with green, and has a series of angular lines (frequently obscured or totally absent) of a pale yellowish brown hue, whose vertices are directed forwards, extending along the middle of the upper part.

* *On the Occurence of Spiders and their Webs in Coal-pits.* By R. H. Meade, F.R.S. Annals and Magazine of Natural History for July, 1860.

same time that it shifted its abode, must also have acquired new instincts becoming social and gregarious in its habits, and thus departing from the manners of most of the spider tribe, which are usually solitary, except when quite young. It may be said that numerous and large spiders' webs are often met with in other dark underground places besides coal-pits, as cellars, caves, &c., but these are always constructed by larger species, each individual living separately and having its own web, the spiders forming them may also mostly be referred to the genus *Tegenaira*, to which our common house spider belongs."

PELTON COLLIERY, JANUARY 25, 1861.

VIII.—*List of Coleopterous Insects added to our Fauna during* 1859 and 1860. By THOMAS JOHN BOLD.

1. POGONUS CHALCEUS, *Marsh.*

Found sparingly on the banks of the river Wansbeck, between North Seaton and Cambois, in September.

2. AGONUM ERICETI, *Panz.*, A. FULGENS, *Davis.*

To Mr. Perkins we are indebted for the addition of this beautiful insect to our *fauna.* Two specimens were captured by him on Muckle Moss in August last; one of these is the usual brilliant copper coloured type, and the other a very rare blackish-green variety, so dark in colour that a novice would fancy it specifically different from the other specimen.

3. AMARA CONVEXIUSCULA, *Marsh.*

Near South Shields in August. Also taken by Mr. Perkins. The capture of this insect shows how desirable it is to avoid thinking that our locality has become exhausted. For not less than fifteen years has the same ground been searched, often specially for this species, but always without success until this year.

4. STENELOPHUS VESPERTINUS, *Ill.*

Captured near Ryton, by Mr. Perkins.

5. BRADYCELLUS VERBASCI, *Sturm.*

This species has, until very recently, been mixed up in most collections with *B. harpalinus* Dej., and the two form the *Bradyc. fulvus* of our Catalogue. The two species have a great similarity, but may be easily separated, *verbasci* being wholly pale-coloured, and the posterior angles of its thorax nearly acute; whilst *harpalinus* is smaller in size, has the elytra dark-brown, with the sides and suture alone pale, and the posterior angles of its thorax nearly rounded. The latter is also the most abundant species in our district.

6. BEMBIDIUM PALLIDIPENNE, *Ill.*

This very nice addition to our local fauna was met with in May, lurking beneath *Algæ*, and debris, on the sea shore, between Blyth and Seaton Sluice. It is not uncommon on the west coast, but it would seem to be exceedingly sparingly distributed on our eastern sea-board.

7. LEPTUSA FUMIDA, *Erich.*

Not uncommon in moss in winter, and I have found it at Gosforth and Long Benton in April.

8. LEPTUSA RUFICOLLIS, *Erich.*

Also taken within our district, but I had omitted to mark the specimens at the time of capture, I believe that they were taken in moss received from Minsteracres. It appears to be much rarer than *fumida*.

9. OCYUSA PICINA, *Aube.*

Rare. Sea-coast near Whitley, and at North Seaton in July.

10. HOMALOTA LANGUIDA, *Erich.*

Rare. North Seaton, September.

11. Gyrophæna lucidula, *Erich.*

In Agarices at North Seaton in September.

12. Agariochara lævicollis, *Kraatz.*

With the preceding, very sparingly.

13. Tachinus flavipes, *Fab.*

Banks of the river Wansbeck, near North Seaton, in September. Rare. I took the same species in East Cumberland in the latter end of May.

14. Quedius cruentus, *Oliv.*

I have a single specimen, taken at Long Benton, in October, and which agrees in every essential character with the description of Kraatz.

15. Trogophlœus corticinus, *Grav.*

Taken near Little Benton in April, and at North Seaton in July.

16. Eusphalerum Primulæ (Kirby), *Steph.*

Specimens of this insect have been taken near Sunderland, by the Rev. Mr. Kirwood. It is very closely allied to, and frequently mixed in collections with *Anthobrium minutum*, from which, however, it may be readily separated by its spinulose tibiæ.

17. Silpha quadripunctata, *Linn.*

One specimen taken beneath bark at Gibside, in June, by Mr. Perkins.

18. Hydrobius punctatissimus, *Steph.*

Also taken by Mr. Kirwood, but the exact locality he had omitted to note; most probably at Saltwell. The only specimen taken is very pale coloured, but in other respects it quite agrees with Erichson's description.

19. Cercus pedicularius, *Linn.*

Wansbeck side, near the North-eastern railway bridge, below Morpeth, in June. Rare.

20. Cychramus fungicola. *Heer.*

On Fungi, in the woods near Hulne Abbey, and between Morpeth and Bothal, September and October. Differs from *Cy. lutea* in being more cylindric, more glossy, (from being less densely covered with hair) and in having a black cloud on each elytron.

21. Aphodius putridus, *Creutz.*

Somewhat rare. Prestwick Carr. The specimens agree in every respect with Gyllenhal's, and with Erichson's descriptions.

22. Agriotes acuminatus, *Steph.*

Taken near Gibside by Mr. Perkins, and by myself at Prudhoe, and at Gosforth, so far back as June, 1846, but the specimens had remained undetected amongst a series of Dolopius marginatus, which it very much resembles.

23. Nanophyes Lythri, *Fab.*

Taken in July, 1860, on *Lathrum salicaria*, at Heaton Burn, Northumberland, by Mr. James Hardy. He remarks that he took the same insect at Spindleston Pond, three years ago, and on the same plant.

24. Scolytus intricatus, *Ratz.*

Burrowing in a fallen elm tree, at Little Benton, in September.

25. Lathridius nodifer, *Westw.*

One specimen, taken on the sand-hills, near South Shields, in October.

A few new localities have been found, for rare or interesting species, which are worth a passing notice. *Agonum marginatum* was found on the sea-shore, near Blyth. *Ophonus pubescens* on

the banks of the Wansbeck, between North Seaton and Camboís. *Harpalus tardus* was found in some plenty, by Mr. Perkins, on the western outskirts of Newcastle. *Homalota gregaria* was also met with at Elswick, on fungi, by the same assiduous collector. *Homalota rupicola* was taken near Blyth, in company with *Bembidium pallidipenne*. *Staphylinus stercorarius*, as recorded in our "Transactions," occurred in the nests of ants, near South Shields. The very rare *Staphylinus latebricola* has been taken on Black Heddon Hills, in August, by Mr. Boyd. *Stilicus affinis*, has occurred, plentifully, in different localities; indeed, it appears to be the commonest species of its genus in our district. *Ocypus ater*, is noted in our "Transactions," as occurring abundantly near North Seaton. *Bledius arenarius* was taken at the embouchure of Meggie's Burn, in September. *Agathidium mandibulare*, has again been met with, in the woods between Sheepwash and North Seaton, inhabiting agarices, growing on decaying wood. *Trogosita mauritanica*, has occurred in quite classic ground, to wit, on the face of the Nineveh Sculptures, that now ornament the staircase of the Literary and Philosophical Society. On removing the packing from these precious monuments of antiquity, several living insects were noticed; a large *Blatta*, and its peculiar egg-cases, was abundant. An *Earwig* was also noticed, as well as great numbers of the *Trogosita*. These insects have in all probability, been denizens of the grain-laden ship which brought the sculptures to this country. Mr. Perkins has taken *Cryptophagus acutangulus*. *Philhydrus melanocephalus* has occurred at Gosforth. *Ptinus rufipes* has been taken in Newcastle, in January. *Rhizopertha pusilla* has occurred at Sunderland, to the Rev. Mr. Kirwood. *Astynomus Ædilis* was taken alive in Grey Street. *Scolytus destructor* has been noticed breeding in immense numbers, at Little Benton, in fallen elms. *Corticarica cylindrica* (*borealis*, Woll.) was found in abundance near South Shields, in October, by tearing up the tufts of Convovulus arvensis and shaking them over a sheet of paper. *Scymnus limbatus* has occurred sparingly, on the sand hills near Blyth.

When down near Blyth, in May, I came upon quite a host of my peculiar game, lying dead upon the sands, apparently deposited

there by the water. They were nearly all Coleopterous insects, and mostly of species that frequent moors; several species of *Aphodius*, some *Curculios*, many *Coccinellidæ*, *Galerucidæ*, *Chrysomelidæ*, *Halticidæ*, *&c.* The beach was literally blackened by their corpses, and, had they only been living, such a find would have formed a *red* letter day of the wet, stormy, unproductive season of 1860.

LONG BENTON, 4th April, 1861.

IX.—*Miscellaneous Notices and Observations.*

Xylophaga dorsalis.—The occurrence of *Xylophaga dorsalis* has already been repeatedly recorded in our "Transactions," but it may not be uninteresting to mention its occurrence a little nearer to the mouth of the Tyne, especially as it has in this instance attained unusual magnitude. In the mid-winter of 1857, I picked up, in Marsden bay, a long piece of Scotch fir, which was thoroughly perforated by large borings of a Xylophaga, and feebler excavations of *Limnoria terebrans*. The shells of the larger examples of Xylophaga were unfortunately not preserved, but numerous small specimens are still embedded in some of the smaller perforations. These agree perfectly with the description of the *X. dorsalis* and it is therefore probable the larger perforations were excavated by individuals of the same species. Some of the borings attain a length of $3\frac{1}{2}$ inches, with a maximum diameter of one inch, which is considerably larger than the greatest measurement given in the British Mollusca. I ascertained that a cargo of Scotch fir props had been wrecked in the bay three years previously. As the prop found was probably one of these, a rough approximation may be made of the short space of time required for the growth of this timber-ravaging mollusca. Allowing a few months to elapse before the submerged prop was attacked by the spawn of Xylophaga, and the same time for the abrasion and casting on shore we have about $2\frac{1}{2}$ years for the completion of the growth of this voracious Xylophagan.—*Richard Howse, South Shields, April* 9, 1861.

Pecten Danicus.—The Rev. Jos. Law of Hylton, first obtained this shell on our coast from the Sunderland fishing boats. More recently I have taken two specimens from the boats that frequent deeper water. One living example, found off the Ferns, is the *var. septemradiatus* Müll. The other normal form was fished up in deep water, 30 miles E. of the Tyne. Both specimens are full grown, and compared with the measurements given in Forbes and Hanley's British Mollusca, are much larger than any from the west of Scotland. Its occurrence has also recently been recorded in the Berwickshire Transactions, by Mr. Embleton, of Embleton. Since writing the above, I have seen a fine specimen in the Newcastle Museum, which was also obtained from deep water fishing boats.—*Ibid.*

Acmæa testudinalis.—"The student of history," says a late excellent naturalist, "follows with intense interest the march of a conqueror, or the migrations of a nation. The traveller traces with almost breathless delight every step of the progress of some mighty hero of ancient days. Yet, absurd as it may seem to those who have not thought of such things before, there is a deeper interest in the march of a periwinkle, and the progress of a limpet." I must confess to having felt during last year, a much deeper interest in the migration of the Tortoise-shell limpet southward along our coast, than in the victorious march of the red-shirted Italian patriot toward Naples and Rome, but it must be confessed that the movements of the former are shrouded in much deeper mystery than the successful march of the latter. Why a limpet, which had formerly its stronghold in the Arctic Seas, and is now plentiful in the boreal provinces of the North Atlantic, should be extending its limits to the south, is what we cannot at present understand or explain. We can say with certainty, from careful searching, that ten years ago, this shell did not occur in three or four places on our coast, where it is now tolerably plentiful. Its first discovery at Whitburn has already been noticed in our "Transactions," and Mr. A. Hancock has lately mentioned its occurrence at Roker. Last Easter, 1860, I revisited an old and favourite searching ground which I had not examined for 10 years, and was much surprised to find it inhabited by the Tortoise-shell Limpet.

The next opportunity was spent in searching a part of the coast near to Sunderland, and at this place it was rather more plentiful than in the former. Last September I obtained two specimens from the rocks in Marsden Bay, and on the 30th of last month, I was delighted to find, after a laborious search, a single small example, apparently the precursor of his race, on the rocks at Hartlepool. We have now recorded instances of the occurrence of this interesting mollusc from Berwick Bay to the mouth of the Tees. The Yorkshire naturalists have not, I am informed by Mr. Leckenby, yet found it in the neighbourhood of Scarborough, but we may shortly expect to hear of its capture there. It also appears to be making rapid progress southward, on the east coast of Ireland, as it has been taken in Dublin Bay, a locality where it did not occur a few years ago.

The authors of British Mollusca describe the animal of this species as "entirely white". All the examples we have met with and examined, have the interior of the mantle of a deep pea-green, which striking peculiarity it retains for years after the animal is dead. The foot and margins of the mantle are of a faint yellow. Concerning the migration of this limpet southward, we may predict that it cannot, on account of the tidal current, extend along the east coast further than Lincolnshire and Norfolk. If it extends to the channel it must be by the coasts of Wales and Cornwall.—*Ibid.*

Goniaster equestris and Nephrops Norwegicus.—One or two specimens a-year at most, of this beautiful star fish yclept by fishermen the sea-pincushion, formerly occurred. They were generally caught on the hooks of the deep water lines, very rarely, nearer the shore. Going on board a trawl boat, in 1858, I was surprised to see a large basket full of remarkably fine specimens. They had all been taken during one days trawling off the Northumberland coast, in about 40 fathoms water.

On the same occasion I observed on board nearly two bushels of that interesting crustacean the Norwegian lobster *Nephrops Norwegicus*. The robust people of the North do not admire the delicate consumptive look of this elegant lobster, and, I believe never partake of it until it has been well digested by a sturdy cod fish

and deposited in creamy layers (delectable sight) between the fibrous flakes that cover his shoulders. The cod-fish himself is very fond of this kind of food, and is, I have no doubt, much obliged to his northern friends for their want of taste. In the Mediterranean it appears to be considered a great delicacy and there the colour of his coat does not, as with us, banish him from good society. This species is not unfrequently brought up on the fishing lines at Whitburn and Cullercoats As the cod-fish is so great an epicure, and culls for himself delicious morsels from depths the keen-eyed naturalist cannot explore, I venture to recommend those who wish to obtain rarities not to fail, when ordering cod's head and shoulder, to have the stomach sent home also—although not a delicacy it contains many. Among other rarities I thus recently obtained remains of a hermit-crab, which Mr. Norman has determined to be *Pagurus Thompsoni*, a species hitherto unrecorded from this coast.—*Ibid.*

Corystes Cassivellaunus.—I beg to introduce to the notice of the club the ancient Briton, *Corystes Cassivellaunus.* For several years I have met with specimens of this masked crab on the sands at South Shields. They are generally washed up after storms very sparingly, but in perfect condition; I have never met with it on any other part of our coast, but it is recorded as occurring at Scarborough. Very little is known of the private history of this strange looking lonely individual, but he is said, by Messrs Edwards, Cuming, and Darwin, to have a near relative living on the coast of Valparaiso. [See Bell's British Crustacea.]—*Ibid.*

Occurrence of a Sea Pen, new to Britain.—Three specimens of a *Virgularia* were lately got from the deepwater fishing boats, by Mr. J. Wright, of the Newcastle Museum, which, on examination, I find to be the *Virgularia Christii*, of Koren and Dannielssen, a species which has hitherto only been found on the Norwegian coast. The *V. Christii* is distinguished from the only recorded British species, *V. mirabilis*, by the polypcells, having clusters of calcareous *spicula* imbedded in their substance, by the absence of *pinnæ* on the stem, and by the upper portion, gradually ending in a graceful curve downwards. The largest specimen obtained is seventeen inches in length, and is of a rod-like form, somewhat

resembling a shepherd's crook. The lower or bare portion of the stem occupies about a fifth of the length. This part is fusiform, swelling a little in the centre and ending in a blunt point. Above this the polyp-cells commence in pairs, increasing in number as they ascend. They are sessile as in *Pavonaria*, thus forming a link between that genus and *Virgularia*. The animal is stated to be a bright red when alive.—*Joshua Alder, Newcastle-on-Tyne, May* 13, 1860.

Note on the local species of Poylgonum.—Mr. J. G. Baker lately forwarded to Mr. Boreau for me, three strongly marked forms of *Polygonum aviculare*, which he announces to be three of the "*segregate*" species of the continental botanists, *P. rurivagum*, *P. arenastrum*, and *P. microspermum*. A fourth form which Mr. Baker sent from Yorkshire, and which, I think, I have also seen here, is referred by Mr. Boreau, doubtfully to *P. agrestinum*. It would be well if our botanical members would collect in their rambles, and preserve any marked forms of *P. aviculare*, for further examination.—*Alfred Merle Norman, Sedgefield, May* 3, 1861.

Ægirus punctilucens (D'Orbigney) and Eolis Northumbrica (Ald. and Han.) at Cullercoats.—Accompanied by Mr. Mennell I spent a few hours among the rocks at Cullercoats, on the eleventh of last month. Our dips into the pools were rewarded by finding two or three very interesting crustacea, which will hereafter be noticed; and our stone-turning by the discovery of *Ægirus punctilucens*, a Nudibranch new to our coasts, and two specimens of *Eolis Northumbrica*. Only one example of the latter species was previously known; that was also taken at Cullercoats by Mr. A. Hancock, but on a coralline from deep-water, while ours were under a stone between tide-marks, apparently making their dinner on *Halichondria (incrustans?)*—*Alfred Merle Norman, Sedgefield, May* 3, 1861.

Nudibranchiate Mollusca, at Cullercoats.—Accompanied by Mr. A. Hancock, I again visited the rocky bay north of Cullercoats, a few days after my visit with Mr. Norman, described in the preceding paragraph. On this occasion an olive variety, previously unnoticed, of *Eolis gracilis* was taken, as well as speci-

mens of the usual colour. Several specimens of the rare *Doris depressa*, and of the following less uncommon species of Nudibranchs, also rewarded our labours:—*Doto coronata*, *Polycera ocellata*, *Ancula cristata*, *Eolis coronata* and *papillosa*, *Doris bilamellata* (of a pure white colour, as well as the normal hue), *D. aspera*, *D. tuberculata*, *D. pilosa*, *Goniodoris nodosa*, *&c.* This list will suffice to show the richness of this spot in this beautiful race of marine animals. *Emarginula reticulata* was also again met with.—*Henry T. Mennell*, *Newcastle*, *May* 15, 1861.

Uraster glacialis at Seaham Harbour.—I have been very successful with the Echinodermata during the present fishing season. Amongst other things I have obtained *Uraster glacialis*, which Mr. Alder informs me, had not before been met with on this coast. I have also a small specimen of *Uraster*, likely to prove *U. hispida*, a great rarity.—*George Hodge*, *Seaham Harbour*, *May* 9, 1861.

Muscicapa atricapilla at Cleadon and East Boldon.—On the 13th inst. I saw at Cleadon, male and female specimens of the *Pied Flycatcher* (*Muscicapa atricapilla.*) I also saw specimens, on the same and subsequent days at East Boldon. I also saw on the 12th inst. in the neighbourhood of East Boldon, several redstarts, *Sylvia phœnicurus*, both male and female. I have never before observed them in this immediate locality.—*E. J. J. Browell*, *East Boldon*, *May* 14, 1861.

Ibid.—In reference to the above, I may mention that, having occasion to be at Whitburn on the day mentioned by Mr. Browell, I was very much struck with the large number of redstarts which were hopping about on every hedge and rail on the outskirts of Monkwearmouth, and along the road from that place, past Roker to Whitburn, where they were extremely numerous. I concluded that a large flock had been detained in their winter abodes by the long prevalence of northerly winds, and had taken advantage of the first change, to make good their passage *en masse*.—*Henry T. Mennell*, *Newcastle*, *May* 15, 1861.

Early occurrence of the Hive Bee.—The 28th of January last was such a beautifully warm and spring-like day, that the hive bee, *Apis mellifica*, was tempted abroad. Several were seen in the neighbourhood of Rye Hill, busily engaged at the flowers of the

Œnothera. On the same day others were observed at the east end of the town, and one found its way into the interior of Picton House. This is the earliest appearance of the hive bee that I am acquainted with.—*V. R. Perkins*, *May* 15, 1861.

Note on the occurrence of Acmæa testudinalis at Cullercoats.—During last May I took a fine living specimen of *Acmæa testudinalis*, on the rocks immediately north of Cullercoats—probably the best searched locality on this well-examined coast. On the same day I also saw two other specimens in the possession of the shoemaker there, who had found one of them at Whitley, and the other at Cullercoats; and I am informed by our excellent secretary, Mr. H. T. Mennell, that one of the younger members of his family has likewise taken, during this spring, an individual of this pretty limpet, in the same locality. This species is, therefore, probably not uncommon on this part of the coast at the present time, though it is quite impossible to suppose that it has existed there any considerable period. It could never have escaped detection till now had it done so; for certainly no place in the neighbourhood has had more attention bestowed upon it than this, by our naturalists. Consequently the occurrence of *Acmæa testudinalis* at this point is the best evidence attainable in proof of the fact that it has only recently appeared in this district, and that, taken in connexion with other facts, it is migrating southward on the east, as it had previously done on the west coast of the island. I had, however, no doubt of the truth of this when, in 1859, I drew the attention of the Club to this matter; and since then strong corroborative evidence has been obtained by my friend, Mr. Howse, to whom we are indebted for the knowledge that this species has already extended its migration as far south as Hartlepool.—*Albany Hancock*, *Newcastle-on-Tyne*, 15*th July*, 1861.

ADDITION TO MR. HODGE'S PAPER ON THE BRITTLE STAR.

Since the foregoing was in print, I have subsequently been informed by the Rev. Alfred M. Norman, that Mr. C. W. Peach, of Wick, had some time ago noticed "hooks," on *Ophiocoma rosula:* on searching for his observations, I found them in the "Proceedings of the Royal Physical Society, in Edinburgh New Philosophical Journal for 1859."

In recording his observations he says: "I have seen these jawlike spines (hooks) on specimens in all stages of growth." This seems contrary to my remarks, but on again going over several specimens, both young and mature, I am fully convinced that these hooks are merely the transition stages of true spines, which may frequently be seen on those parts of the rays which have been recently produced, no such hooks being visible on the old portions of the rays; in this case, the hooks have been modified by further deposits into the blunt stout spines, seen on the under side. It seems highly probable that this method of growth will, under certain variations, be of frequent occurrence.

To Mr. Peach, therefore, is due the credit of being the first to notice these hooks, although there he appears to have stopped, and, so far as I can learn, the transformation of the hooks into spines is now for the first time made known. G. H.

Seaham Harbour, 18th July, 1861.

X. — *Effects of the Severe Winter of* 1860-1 *upon Evergreen Vegetation in Northumberland.* By Ralph Carr, Esq.

[Read at the Evening Meeting, December 5, 1861.]

Though the winter of 1860-1 was remarkable for its intensity of frost, and though coming after a cold, ungenial summer, and a very wet autumn, it was peculiarly trying to evergreen vegetation, yet the severe frost was not protracted into March and April. December and January were rigorous in the extreme, but February (often the coldest month in the northern counties) was open and temperate. March, April, and May were all favourable, so that a timely spring gave the promise—now happily and mercifully fulfilled—of a fine summer and plentiful harvest throughout the British Islands, some of the north western coasts excepted. In the south of Europe excessive heat and drought have prevailed; which, being preceded by a winter of the same character as our own, have shown the Continental climate in its greatest extremes of temperature.

The effects upon cereal crops have there been unfavourable, so that scarcity has ensued, whilst the vine, on the other hand, has yielded its produce in abundance and perfection.

In England we have had but little fruit in our gardens and orchards, owing to the scantiness of blossom buds formed in the cold, cloudy summer of 1860. But the greatest deficiency observable is the loss of many large ornamental evergreens, even of species so hardy as the Pontic and Portugal laurels. In low situations both have suffered severely, when not killed outright; and, in some instances, the common Holly has also been destroyed. The Yew is liable rather to be stunted than killed by our Northumbrian climate; yet at Bolton and Chillingham, Yews of some standing have had their entire tops, consisting of numerous branches, quite destroyed. I have nowhere observed any Box Shrubs frozen, though in such winters their vegetation receives an evident check, and they become redder of tint than usual in the summer following.

Mahonia acuifolia, holly-leaved berberry, has shown itself everywhere hardy with us, though it will not thrive under the shade of trees as in the south of England.

This beautiful shrub bears even our northern climate admirably. It feels the influence of our earliest spring sun, putting forth its flower buds in February, and expanding them in April. And since its fine purple clusters of berries are ripened perfectly, even early in September, it has become already almost as a native plant.

Quercus ilex has shown itself almost as tender as the Arbutus and Sweet-bay in most situations a few miles distant from the coast. Within range of the tempering sea-air, as at Howick and Fallowden, it assumes the character even of a tree, in some instances.*

Among the multitude of most beautiful hybrid Rhododendrons which adorn the southern English shrubberies, only a few are found to flower freely in the north. Numbers, however, are quite hardy as evergreens; and when they fail to flower, repay their cultivation to some extent by their fine foliage, especially those which show something of the race of *Rhododendron campanulatum*, in the lovely buff colouring of the under surface of their leaves. *Rh. campanulatum* itself can scarcely be described as hardy with us, since its leaf-buds are often killed by frost in winter, the growth is checked, and flower buds are not formed.

If we turn to the great array of *resinous* plants which have obtained so much attention of latter years, in *pinetums*, and lesser collections of the same character, the tale of the bygone winter is various, but too often not encouraging.

Woeful has been the destruction in the Edinburgh Botanical Gardens, and in the adjacent nurseries. The two celebrated specimens of *Araucaria imbricata* are killed to the ground. A like fate has befallen almost every one of their subordinates, not only in the Botanical Gardens, but far beyond. Hence the only uninjured plants are those which were so young as to have remained entirely covered by snow.

* A large ilex which stands alone, and in a situation very much exposed to the weather, in the churchyard at Castle Eden, escaped unhurt, whilst all those in the low grounds about Greatham, and near the sea, were killed to the ground.—Rev. H. B. Tristram.

The site of this noble establishment being on a southerly slope, fully exposed to the sun, a continual alternation of thawing and freezing, freezing and thawing, must be going on, during the severe frosts that so often follow our great snow-storms.

In highland or upland situations, near the hills or moors, the snow falls much thicker, the frost is often somewhat less intense, but is more continuous, and not nearly so liable to be broken by mid-day thaws, followed in their turn by more biting cold than ever, in the evening.

This steady frost and deep snow of the uplands is far more favourable to *Araucarias* than alternations of temperature. As they will bear a great weight of snow without being broken by it, nature's white blanket ought never to be disturbed by the gardener.

The two principal *Araucarias* at Edinburgh were about twenty feet and twenty-five feet high, as nearly as I could estimate without measuring, and their diameter at the base, just above the roots, was about twelve inches.

Sir Charles Monck's stately *Araucaria*, at Belsay, is twenty-nine feet high. It was, when I saw it, quite as thick in proportion to its height as those at Edinburgh, and equally well clothed with branches, so that its diameter must considerably exceed theirs. By a communication from its much-respected owner, who has long been distinguished as a patron of phytological science, and as a cultivator and collector of rare and interesting ligneous plants, capable of bearing the open-air in our climate, it will be seen that this, which must be now much the noblest specimen existing north of the Trent, remains uninjured. Sir Charles Monck's account of the condition of the Belsay collection—now that a subsequent summer has tested the injury done by the past winter—is of peculiar interest. I send it for insertion in the next number of our "Transactions," together with the record of the temperature at Belsay during the frost, which is one of the best and most carefully kept memorials of the extraordinary cold, that I have seen.

Deodaras, too, succeed best in rather an upland climate, if sheltered from too much exposure to the west. It is necessary

often to lighten their burden of snow a little, lest they should be utterly prostrated; but we should meddle as little as possible at such times. Almost every *Deodara* at Edinburgh has suffered serious injury to its foliage for a year or two.

Happily, in many situations in Northumberland, both on elevated but well-sheltered grounds in the interior, and in sheltered localities near the sea, many fine specimens of *Araucaria*, *Deodara*, and other of the most interesting species of exotic evergreen vegetation, remain unhurt; whilst at Chillingham, Eslington, East and West Bolton, Lilburne, the river-sides at Alnwick, and the gardens and terraces at Gibside, wheresoever lawns occupy low ground, subject to excessive dews and hoar frosts, the damage has been serious. On the other hand, the higher garden grounds and more airy lawns or shrubberies have suffered little at Twizell, Rock, Swansfield, the upper portions of Huln Park, Roddam, Glanton Pike, and Hedgeley. The gardens at Fallowden, though on a low level and near water, enjoy a mild winter-climate, from their vicinity to the sea. Here grow stately ilexes, and a remarkably fine *Cryptomeria japonica*, large plants of the sweet bay, &c. Howick also is favourable to the ilex, which has shown itself generally not much hardier than the arbutus in Northumberland. At Swansfield and at Glanton Pike, both occupying elevated summits, but well sheltered by wood, we find two of the best and most vigorous *Araucarias*.

Of *Cryptomerias* we have but few tall and thriving specimens, many having been destroyed by the last or preceding winters. Not only at Ravensworth Castle, however, are there fine *Cryptomerias*, but several, not easily surpassed, in the garden grounds of the Rectory at Whickham, which develope themselves in a very robust manner, on high airy ground. At Edinburgh, in Lawson's nursery, many *Cryptomerias*, six feet high, remained unhurt, but their numbers are much diminished since last year.

These facts will be held, I think, to add new interest to our local Climatology, whilst they are encouraging to the owners of gardens and pleasure grounds of unpretending extent and character; as showing, that favoured by nature in the hour of trial,

they may often compete successfully with lawns almost unlimited, but where old Jack Frost is too close a neighbour, and walks forth with his shears by starlight to mar all the collector's pains.

At Edinburgh, a strong specimen, six feet high, of the Stone Pine—*Pinus Pinea*—in the arboretum of Lawson's nursery, was destroyed. In the Botanical Gardens, not far from the celebrated *Araucarias*, a stately *Cupressus macrocarpa*, not less lofty, though comparatively very young, had ceased to exist, as also a noble specimen of *Arbutus andrachne*. The beautiful *Thuja gigantea*, with its robust form and bright glossy foliation, had successfully braved that bitter frost. Its stature was about five feet only—the species having been but recently introduced—but with a stem very thick in proportion. This *Thuja* may be boldly cultivated when its price becomes moderate.

Of the so-called *Thuja borealis*, from Northern California, I am unable to report so distinctly, but have reason to believe, from the fine condition of numerous young plants, two or three feet high, that it is hardy.

It is fortunate that so beautiful a shrub as the drooping juniper of the Himalaya, *Juniperus recurva*, is decidedly hardy, at least in our snowy inland climate of the skirts of the Cheviots. It is not only an elegant plant at all seasons, but produces both a pleasing inflorescence early in spring, and pretty, dark, cone-like berries towards the year's decline. At Rock is a fine specimen.

Many of the large old Portugal Laurels, in the Edinburgh Botanical Gardens, came to their end. The old Ilexes remained nearly leafless all the summer, but are now slowly recovering; and some Hollies were killed. The common Box braved the storm well. The Balearic or Constantinople Box succeeds fairly, if half-shaded from the sun; but it does not assume robust growth, either in Great Britain or Ireland, so far as I have ever seen. The Balearic Holly is hardy in Northumberland, except under shade, where it would probably be cut off. It requires, however, to be sedulously guarded from hares and rabbits, as they eat it with extraordinary avidity, which accounts for the rareness of this fine species, notwithstanding its presence in

every nursery, and its rapid growth. In some few instances its branches have been deprived of vitality by the frost, which has rent the bark, and thus shown how narrowly this southern form of the Holly has escaped annihilation here. Though growing so quick while young, our cold winds soon check its upward advancement. It attains not the height of the native Holly of our woods.

All the species of *Laurustinus* have been cut down, but are springing well; which is also true of those comparatively few plants of *Arbutus unedo*, that have been cultivated in our north eastern county, except that in sheltered spots, near the sea, it claims a hardier character. Yet even near the Cheviots, it has stood nearly twenty years, though killed in 1854-5.

Garria elliptica is an interesting evergreen shrub from Virginia and Carolina, very robust in its growth, and distinguished by its fine show of long pendulous catkins in spring. I have reason to believe that it will succeed better in our snowy upland climates than elsewhere, but it will not bear to be overshaded.

Reverting to resinous Trees, our experience here of *Abies Morinda*, the beautiful spruce of the Himalaya, accords with that of Sir Charles Monck. It is easily deprived of its leading shoots by frost, or paralysed for a season by the loss of its terminal buds. At Edinburgh it succeeds much better, though paralysed throughout the present summer.

Abies Webbiana and *Pindrou* are too early in their spring vegetation for our inconstant northern climate. They lose their terminal shoots almost every other spring; neither do their fine long pectinated spinelets acquire anything like full development here.

Abies Pinsapo, from the mountains of Andalusia, is wonderfully hardy—a pretty fir of small stature; but its near congener, *A. Cephalonica*, vegetates much too early, and is continually disfigured by withered buds.

In this district, of the vale of Wooler, the *Wellingtonia* has been successfully cultivated: the extreme cold of last winter, and two trying winters preceding, not having even scorched or discoloured its verdure. At Roddam, on the very skirts of the

Cheviots, is our largest specimen,—I believe five feet high, or upwards; and, at Lilburne—a site subject to great intensity of frost, and close to a stream flowing direct from Hedgehope Hill, —are no less than fifteen fine *Wellingtonias*, about four feet in stature. Here, at Hedgeley, is a similar one, very robust and healthy. Of those at Chillingham, I have not positive information, but have reason to believe they are safe, though the spot where the Castle stands is one of the frostiest sites in the county. One plant of this species, on ground a little higher than the Castle, I lately myself saw in good health.

The *Wellingtonia*, however, in this northern climate,—though of healthy and robust growth, and exhibiting a peculiar *port*, or characteristic bearing of its own, suggestive of strength and majesty,—will yet, in all likelihood, not exceed with us the stature of a large *Arbor-vitæ*, or of our Italian cypresses of Devon.

We must not look for gigantic proportions, but we have probably acquired a new conical tree of secondary stature (or, perhaps, only a tall and stately shrub), well adapted to adorn our lawns and arboretums, and able to brave not only the utmost severity of our insular winters, but our tempestuous winds.

The *Wellingtonia*, in Spain and Italy, as in its native California, may perhaps be found to vindicate its epithet of *gigantea*.

I must express regret that these memoranda are not both more perfect and better arranged.

HEDGELEY, October 25, 1861.

We owe the following authentic notices from the Belsay Arboretum, to Sir Charles Monck's kindness and accurate observations:—"My oldest and largest *Araucaria imbricata*, was measured last April, and found to be twenty nine feet high. It did not suffer in a single leaf lost. I have six or seven more, and younger, in the same enclosure, and about eight or ten feet high. One is scorched at the ends of its branches; not more than will be recovered in a year or two. *Deodar Cedars*, twelve to fifteen feet high are not damaged. Of Pines,—*Picea insignis* eight feet high was killed outright. *Picea ovata*, (a beautiful pine), above half killed, but has made a gallant effort to recover, which I en-

couraged. *P. Brunoniana* nearly killed, *P. morinda* all much shaken and unable to make growth this summer; but have formed buds from which to sprout next spring. Douglass pines, forty to fifty feet high, and girting between five and six feet, not in the slightest degree injured; *Cembra pines* of course not hurt, and bearing ripe cones this year. *P. nobilis*, fifteen feet high, a seedling plant, not in the least degree injured. *P. cephalonica* and *pinsapo*, not injured. *Laurustinus*, *Phillirea*, *Alaturnus*, and *Iudas*, were killed to the ground, but coming up strong. *Camellias*, some killed down and sprouting again, some unhurt. Magnolias, of which here are ten or eleven kinds, all safe. *Cedar of Goa*, twelve feet high, killed outright. *Palm of Chusan* in China, (*Chamærops excelsa*), not hurt, *Clerodendron fœtidum* unhurt, *Benthamia fragifera* half killed, *Catalpas** unhurt, *Olive of Nikita*, killed to the ground but springing. *Buxus Balearica* hard held, one killed to the ground, another only half killed. *Gum Cistus*, where not covered with snow nearly killed, Common and Portugal Laurels unhurt, *Thuia filiformis* killed, other *Thuias* unhurt, *Escallonia macrantha*, covered with snow, unhurt."

The following is an extract from the register kept by the gardener at Belsay:—

The frost began on the night of the 13th December, when the Thermometer fell to 30°:

On the	14th to	34°
„	15th „	31
„	16th „	27
„	17th „	30
„	18th „	23

When the snow began, and covered the ground 16 inches deep, and about this depth of Snow was maintained throughout the frost.

On the	19th to	21°
„	20th „	24
„	21st „	25
„	22nd „	24
„	23rd „	14
Xmas. eve	24th „	10
„	25th „	12
„	26th „	15

* At Crediton (Devon), Catalpas were all killed, as also in Norfolk and Suffolk.—Rev. J. F. Bigge.

On the 27th „ .....18°
„ 28th „ 13
„ 29th „ 20
„ 30th „ 32
„ 31st „ 31
Jan. 1861 1st to 28
„ 2nd „ 27
„ 3rd „ 15
„ 4th „ 10
„ 5th „ 15
„ 6th „ 19
„ 7th „ 12
„ 8th „ 19
„ 9th „ 27
„ 10th „ 29
„ 11th „ 35
„ 12th „ 27
„ 13th „ 25
„ 14th „ 31
„ 15th „ 29
„ 16th „ 33
„ 17th „ 31

The rest of the month was fresh weather. On the 24th and 25th of December the maximum during the day was 18° and 16°, on the 4th Jan., 22°. The Thermometer was suspended four feet from the ground on a garden wall facing the north. Height above the sea about 350 feet."

"Belsay, Oct. 19, 1661."

P. J. Selby, Esq.,* of Twizell House, in a letter dated 12th March, 1861, writes as follows:—The frost at Twizell never attained the severity, it appears to have done in many parts of England and Scotland, as my thermometer upon two occasions only fell to 8° and 9° above zero or to 23° and 24° frost. I commence with the *Laurustinus*, which is killed to the ground; Portugal laurel a little injured in the leaf where much exposed; common laurel, in consequence of being weighed down and covered with snow, very little injured—not more than I have seen in comparatively mild winters; sweet bay much injured and not likely to recover; *Rhododendrons* uninjured, *Leycesteria formosa* killed

* Extracted from the Transactions of the Botanical Society of Edinburgh.

to the ground; *Arbutus Andrachne* killed; China roses killed to the ground. The following is the state of the *Coniferæ*;—Two fine plants of *Pinus insignis* upon the lawn, much injured, one of them scarcely expected to recover; *P. austriaca*, *P. Cembra*, *P. excelsa*, *P. Pallasiana*, *P. pyrenaica*, *P. Montezumæ*, and *P. Laricio*, all uninjured; *Cedrus Deodara*, *C. Libani* and *C. atlantica* uninjured, *Araucaria imbricata* uninjured; *Abies Menziesii* and *A. Morinda* uninjured; *Picea nobilis*, *P. cephalonica*, *P. Pinsapo*, *P. Pichta*, and *P. Webbiana*, all safe; *Cryptomeria japonica*, upon the lawn, much browned, but uninjured, in sheltered situations; *Sequoia sempervirens* much injured where exposed; *Cupressus funebris* killed; *C. torulosa* greatly injured, not likely to recover; *C. lusitanica* killed, *C. Lambertiana* uninjured, *C. Goveniana* not expected to recover; *Wellingtonia gigantea* uninjured. My wall-fruit trees have suffered greatly from the immature state of last year's shoots, and I also find that many of my Pyramid Pears have lost their buds.

XI.—*Algological Notes*, 1861. By G. S. Brady.

The following notes embrace such observations as have occurred to me, with respect to our local marine algæ, since the publication of the catalogue in vol. IV of the "Transactions." The number of additional species is only four, and for the discovery of two of these we are indebted to Mr. Hodge of Seaham Harbour, whose collection I regret I had not seen before printing the catalogue.

The most notable features of the past season (1861) have been the unusual luxuriance of the smaller Melanospermeæ and an almost equal paucity of Rhodospermeæ. For example, on the beach north of Whitley, where I have been used in autumn to find abundantly *Nitophyllum ocellatum*, *Polysiphonia parasitica*, and *Dasya coccinea*, I have this year not seen a single specimen of any of them. *Polysiphonia byssoides* was there, however, in its usual profusion. Mrs. Merrifield of Brighton, informs me that the marine vegetation of the south coast has exhibited a

similar discrepancy, and she supposes that the prevalent heavy seas from the south and west have sufficed to destroy or prevent the growth of the more delicate red weeds, but this can scarcely have been the active cause on our portion of the coast—where I believe the sea has been by no means more than usually boisterous.

Mesogloia virescens.—In extraordinary abundance amongst stones north of Dunstanbro' Castle, in July; also at Roker.

Myrionema strangulans.—On *Porphyra* and *Enteromorpha*, north of Dunstanbro' in July; and at Whitley rocks in September. This species has not been previously observed in our district.

Ectocarpus granulosus.—Mr. Hodge's collection contains a single specimen found on the coast near Seaham Harbour.

Ectocarpus fasciculatus.—I gathered this near Seaham Harbour in June. It appears to be a very scarce species with us, though called common by most algologists.

Myriotrichia filiformis.—Parasitic on *Dictyosiphon* at Dunstanborough. This is not a rare plant, but I am not aware that it has previously been found growing on anything except *Asperococcus echinatus.*

Gracilaria confervoides.—At Hartlepool in shallow pools near high water mark, April 27th. Some specimens were beautifully in fruit.

Callithamnion Plumula.—This beautiful species was found by Mr. Hodge, washed up on the beach at Seaham Harbour. It had probably grown on the rocks at or beyond low water mark, and might perhaps be found *in situ* by careful search.

Callithamnion brachiatum.—Two specimens were found at Dunstanbro' in July; growing on the stem of *Laminaria.*

Oscillatoria littoralis.—This species was included in the catalogue, but I was unable to give the precise locality. I have this year found it abundantly in salt marshes at Warkworth and Hylton on the Wear.

Vaucheria velutina.—In salt marshes at Warkworth.

Ulva bullosa.—In ditches of brackish water at Hartlepool.

Though not reckoned among marine algæ, the occurrence of this species in brackish water seems rightly to give it a place in our list. I am not aware that it has been previously noticed in other than fresh water. Sir W. J. Hooker, conjectures that it may be merely *Ulva Lactuca* (a marine species) altered by difference of habitat; and its occurrence in the intermediate position, I think, materially strengthens his view. In point of structure there is no material difference between the two plants.

Note on Callithamnion Rothii.

The influence of external circumstances in introducing changes of species, and the range of altered conditions which individual species are qualified to bear without change or death, is a matter which seems as yet to be very imperfectly understood, notwithstanding that it lies near the root of much that has recently been written, respecting the succession of life on the earth. Viewed in this light, the following remarks on one of our native algæ may not be without interest.

In February of last, and June of the present year, I observed that certain stones near the mouth of a cave, a little north of Hawthorne Dene, were covered with a red velvetty fleece, which on examination proved to be *Callithamnion Rothii*, one of the smallest of the Rhodosperms, its filaments seldom much exceeding half an inch in length. The stones thus coated with the *Callithamnion* were exposed to a heavy dripping of fresh water from the roof of the cave, (not merely a scanty fall of drops, few and far between, but a copious pelting, sufficient to wet one very unpleasantly while gathering specimens) and beyond the area of this dripping the plant did not extend. The mouth of the cave is not very far below high water mark, and I should judge that in this position the plant must be exposed to alternations of about four hours washing with sea water, and eight hours with fresh. I have met with no other instance of a *Callithamnion* growing under exposure to fresh water, and when *C. Rothii* is found (as is often the case) on rocks near high water mark, it is almost always so stunted as to amount to little more than a red film or crust, in which state

it constitutes the *Byssus purpurea* of old authors*. In the Hawthorne locality, however, it attains a size larger than usual even in favourable situations; so that the fresh water cannot be supposed to exercise any prejudicial influence on its growth. Now, it so happens that there is another genus described by algologists, (*Trentepohlia*) which, according to Professor Harvey, differs from *Callithamnion* in no other respect than its *fresh water* habitat. Indeed, in the first edition of his "Manual of the British Algæ," he remarks "that *C. Daviesii* and *T. pulchella*, when the latter is well coloured, are scarcely distinguishable under the microscope." It seems to me that the Hawthorne plant goes a great way to establish Dr. Harvey's view of the identity of the two genera, for though exposed for about sixteen hours out of twenty-four to the influence of fresh water, it is certainly referable to the marine species *Callithamnion Rothii*, and at the same time is undistinguishable, so far as I can gather from figures and written descriptions, from the fresh water species *Trentepohlia pulchella*. There is nothing exceptional in the case of a plant growing indifferently either in salt water or in fresh. The common *Enteromorpha intestinalis*, a marine species, flourishes in streams, ponds, and ditches quite away from sea influence. *Bangia fusco-purpurea* has been found in like circumstances; and even with animals, instances of a similar tolerance might be brought forward. In short it seems quite unphilosophical to separate plants which are to all appearance precisely similar, merely on account of a difference in habitat; for what does such a circumstance show, more than that a single species possesses the capacity of of existence under widely different conditions?

* *Byssus purpurea* is noted by Mr. Winch as occurring "on rocks and stones in alpine situations." Assuming that the plant alluded to is the same as that found on rocks with marine exposure (which, though evidently inferred by Mr. Winch, is perhaps reasonably open to doubt) there seems the less reason to hesitate in uniting the two *aquatic* forms. But without further evidence of the identity of the two terrestrial plants it is impossible to push this argument.

XII.—*Contributions to the Marine Zoology of Seaham Harbour.*

By George Hodge. (Pl. II., figs. 1-9.)

PART II.

3. Entomostraca.

On the evening of the 3rd August, the sea was literally "alive" with Entomostraca and various larval forms of crustacea, &c. Being on the rocks collecting, I noticed very many in the small pools, and on freely plying a net in the open water, countless numbers were obtained; in fact, they could only be compared to a mass of red paint at the bottom of the net.

4. Dredging at Seaham Harbour.

Various are the opinions expressed by our "Tynesiders" as to this means of collecting. Many are the attempts that have have been made, and many have been the failures. In most instances one result is pretty certain--sea sickness. During the last year or two, on several occasions I proceeded to sea, determined upon giving the dredge a fair trial, but the result was always most unsatisfactory. Perseverance will, however, overcome most difficulties, and amongst the number, the difficulties of dredging. For the information of some of our members who I know have been disappointed on several occasions, I will endeavour to record the result of some half dozen "scrapes" in water, varying from 6 to 12 fathoms, and also in 25 fathoms. From the sea being rough and the wind uncertain during the early part of the summer nothing was attempted; however, on the evening of the 17th August, I made a start. A fine south-west wind puffed out the sail, and on arriving at a suitable spot, and all being ready over went the dredge: jerk, jerk, jerk, it went over the bottom, sometimes a steady pull, varied by a little twitch, showed it was doing its work. Some fifteen or twenty minutes having been so spent, it was hauled up; behold the result—sponges, zoophytes, star fish, crabs, and molluscas, of various species, and in sufficient numbers to satisfy all reasonable demands; several hauls were

made during the evening, the result being all that could be desired. The first evening's work being so successful other opportunities were embraced, and in no case did I return home with my bottles empty; true, on one or two occasions, the wind was so strong, that once out, our only thought was to return; such disappointments must, of course, be expected occasionally.

A whole afternoon was spent, about seven miles out, in twenty-five fathoms water, but unfortunately sea sickness damped much of the ardour of our collecting; and, but for the valuable assistance of one of our Vice-Presidents, the result would have been very poor. In the three departments of Echinodermata, Crustacea, and Mollusca, the following were the captures: the two latter classes having been kindly furnished me by the Rev. A. M. Norman

ECHINODERMATA	——— Thompsoni	Artemis exoleta
Ophiura texturata	Crangon vulgaris	——— lincta
——— albida	Notodelphys ascidicola	Venus striatula
——— ———(N.S.)	Eurynome aspersa	Astarte compressa
Ophiocoma filiformis	Porcellana longicornis	Cyprina Islandica
——— ———rosula	Stenorhynchus phalangium	Cardium echinatum
Uraster rubens	&c., &c.	Leda caudata
Asterias aurantiaca		Nucula tenuis
Echinocyamus pusillus	MOLLUSCA	Pectunculus glycimeris
Spatangus purpureus	Ascidia srdidoa	Pecten opercularis
Brissus lyrifer	Molgula ———	——— tigrinus
Amphidotus cordatus	Saxicava rugosa	Tritonia plebeia
——— ——— roseus	Corbula nucleus	Philine scabra
Sipunculus ———	Solen pellucidus	Tornatella fasciata
	Syndosmya prismatica	Dentalium entalis
CRUSTACEA	Psammobia ferroensis	Turritella communis
Hyas coarctatus	Mactra elliptica	Aporrhais pes-pelicani
Portunus holsatus	Lucinopsis undata	Natica nitida
Ebalia Cranchii		Cyprœa europœa
Pagurus Bernhardus		Buccinum undatum
——— ——— lœvis		Fusus antiquus
		&c., &c.

Many Crustacea and Mollusca of small size were passed over. I need scarcely say, various sponges, zoophytes, and miscellaneous animals were also obtained.

I trust, next year, our coast may be regularly worked, much remains to be done, more especially in water of moderate depth, not frequented by the fishermen, and consequently unexplored.

If such of our members as are interested in marine zoology would unite, take a district, and steadily work it at all convenient opportunities, the captures, after satisfying their own demands, might be divided amongst the several workers; by this means our cabinets would be wonderfully enriched, and observations of the habits and localities of animals greatly multiplied: independent of these considerations, first-rate collectors would be made from mere "dabblers," and an intimate acquaintance gained of those beautiful and marvellous forms of marine life, which are only seen in perfection when fresh from the "blue depths of ocean." I respectfully submit this to the consideration of the Committee, as being a most desirable opening for the steady work of our Field Naturalists.

5. Occurrence of Corymorpha nutans at Seaham.

I dredged large numbers of this beautiful zoophyte during the present year, in water varying from six to twelve fathoms. They are found on a sandy bottom, the base of the polypary being plunged in the sand, patches of which come up, adhering together by some peculiar viscid material put forth by the animal. Those taken were freely producing medusoids, the appearance and general character of which I had an admirable opportunity of observing and figuring.—In Plate II., figures 1 to 9, are depicted the polypary, life size, and magnified representations of the medusoids during their immature and perfect stages. The excessive delicacy of these animals renders it impossible to keep them alive longer than twenty-four to forty-eight hours, after which they droop and speedily decompose. This species had not previously been taken on this coast; the only other localities that I am aware of are, Bay of Stromness (Forbes and Goodsir), Fowey in Cornwall, and Isle of Man (Alder). It is unnecessary to give a description of this animal, as it has already been ably treated in Johnston's History of British Zoophytes; but as the figure given in this work does not quite agree with those taken here, I

venture to put forward my drawing, made from a fine healthy animal, a few hours after its capture; and although deficient in many respects, it, perhaps, gives a better idea of the form and arrangement of the tentacles, than that already published. Those obtained here do not attain the large size of the Stromness specimens as mentioned by Dr. Johnston.

The medusoid has not been figured in any British work, so far as I am aware. Forbes, in his "Naked-Eyed Medusæ," figures some forms for which the genus Steenstrupia was constituted, conjecturing at the time, that they might be the medusoids of Corymorpha. His figures and descriptions do not, however, agree with those under consideration, which are much more elegant in form and appearance generally, than those he describes. I would, therefore, offer the following account of the growth of the zooids far as I have been able to trace them.

The gonophores are produced from branching processes, which have their origin near the base of the second circlet of tentacles; each stalk bears several gonophores in various stages of development, (see figure 7). At the earliest stage that I have noticed them, (figures 2, 3), they are little pyriform bodies, about $\frac{1}{150}$ of an inch in their greatest length. The thicker or distal end then puts out four lobes, one much larger than the others, within each is a patch of colour of a pale pink tint (figures 4, 5), there is also a faint indication of the peduncle and radiating canals, which are, however, more apparent in the next stage (fig. 6).

The zooid would then appear to *distend* itself, becoming, in consequence, more transparent, allowing the form to be better seen. The next stage that I observed showed a considerable increase in dimensions; the largest lobe now appeared as a granular mass, which differed greatly from the others in the character of its contents (fig. 8).

Finally, the attached zooid attains full development, and becoming detached from the parent, by a long continuance of spasmodic jerks, floats away as an exquisitely delicate little bell, and continues its voyage by means of the contractions and expansions so characteristic of these animals, first darting to the right and then to the left, rising through the water in a zig-zag

direction. It is a charming sight to see some dozens of these delicate little germs, in the limited space of an aquarium, all life and activity, darting hither and thither, sometimes gently dropping towards the bottom of the tank, in consequence of the arrest of the pulsating movement, and then rising again with an ease and elegance truly wonderful.

When free and apparently fully developed, this medusoid presents the following characters :—

Umbrella nearly globular, distal end turning over into a lip towards the marginal canal; proximal end continued into a short conical apex, into which the sub-umbrella is produced. Peduncle stout, nearly equal in length to diameter of sub-umbrella; mouth indistinct, possibly a simple orifice. Marginal glands four, one much larger than the others, which gives origin to a tentacle, composed of a moderately stout filament terminated by a globular bulb nearly equal in size to the gland producing it; between the terminal bulb and marginal gland are seven smaller bulbs, all showing a granulated character.

Orifice contracting so as to form a truncated cone, the apex being half the diameter of the base. Colour of medusoid, pale yellowish brown, of eye spots, bright carmine.

EXPLANATION OF FIGURES 1-9. (PLATE II.)

Fig. 1 Corymorpha nutans.
„ 2, 3 Early stages of medusoid.
„ 4, 5 Further do. do.
„ 6, 7, 8 do. do. do.
„ 9 Fully formed, free medusoid.

XIII.—*On a New Hydroid Zoophyte (Podocoryne Alderi).*

By George Hodge.

I met with this new Zoophyte during the present year, and venture to offer the following description of it :—

Polype elongate, extensile, tapering towards the base, and surmounted by a conical, sometimes, obtusely rounded

mouth, below which is a single verticil of moderately long, extensile tentacles, in number varying from six or eight to twelve.* Polype soft and fleshy, of a pale pink colour, without any appearance of a hard investment: apparently produced from a ramifying, creeping root, which is seen with difficulty. Height, $\frac{1}{4}$ to $\frac{1}{2}$ inch,

Reproduction by means of medusoids, which are produced a short distance below the origin of the tentacles; variable in number, sometimes four being seen on each polype, forming an imperfect circlet; at other times only one medusoid appears on a polype. The medusoids, when free, possess four pair of granulated tentacles, of unequal length and dimensions, generally thickening towards the free end, and forming a tapering bulb. Eye spots of a deep red colour. Peduncle of a pale green tint, with four short capitate tentacles. Medusoid nearly semiglobular.

This little Zoophyte was obtained from deep water, incrusting the shell of a Serpula, attached to a specimen of *Aporrhais pespelicani*. The shell, with its several parasites, was deposited in a tank, containing sea-water. This was during the early part of the spring—there they remained during the summer; and, in August, a sketch was made of four individuals, presenting various aspects, which was followed by a figure of the medusoid in September. Little attention was paid to the polypes or to the figures; but being submitted (with some other drawings) to Mr. Alder, accompanied by two or three depauperated specimens—all that remained of a considerable number—he informed me they belonged to the genus *Podocoryne*, and was of opinion this species had not been described. The Rev. T. Hincks, of Leeds, confirmed this opinion.

I therefore venture to put forward my figures; and in offering the foregoing description, I do so with considerable diffidence.

* I strongly suspect the variations in the number of tentacles may be accounted for by the following passage in Professor's Green's "Manual of the Cœlenterata," page 88:—"But the proliferous stalks of Podocoryne are furnished each with a mouth, and differ little from true polypites, save in their smaller size and the possession of fewer tentacula." I was not aware of this circumstance when my observations were made, and imagined the difference was merely a similar variation to that often met with in other forms.

It unfortunately happens that the notes I made at the time were very incomplete, and I am therefore prevented from giving a full description of the animal; that given, may, however, be sufficient to identify it, should other specimens be obtained.

I have great pleasure in naming this species after my kind friend, Mr. Alder, to whom we all owe so much for his labours amongst the zoopytes of our district, and who may be said to be "the father of the zoophytology of Tyneside."

EXPLANATION OF THE FIGURES 10-15. (PLATE II.).

Fig. 10 Podocoryne Alderi
„ 11 Free medusoid
„ 12 Pair of tentacles with eye spots at their base
„ 13 Portion of tentacle showing granulated appearance
„ 14 Peduncle
„ 15 One of the tentacular processes of peduncle

XIV.—*Notice of the occurrence of Caprimulgus ruficollis in England.* By John Hancock.

On the 6th October, so far back as 1856, I obtained a fresh killed specimen of this rare European Goat Sucker, of Mr. Pape, game dealer, of this town. It was shot the previous day at Killingworth, near Newcastle. I could not determine the sex from dissection, but I think it is most probably a male, as the first primaries have each a spot upon their inner webs, and the first two spots are white. I have delayed until now making this announcement, for I found on comparison, that the bird in question differed slightly from a Hungarian specimen in my collection, and I was consequently anxious to see others before doing so. I have now had an opportunity of referring to a specimen in the British Museum, and find that it quite agrees with my bird. I have therefore no longer any hesitation in stating that it is the true *Ruficollis* of authors; and I have much

pleasure in adding this fine species to the British list of occasional visitors, though I am far from believing that this is really its first occurrence in our island. It very closely resembles the *C. Europæus*, and is almost sure to be confounded with that species by the casual observer.

XV.—*Some remarks on the common Glow-worm, Lampyris Noctiluca and its Larva.* By V. R. Perkins.

No one who has ever seen the Glow-worm emitting its brilliant light on the road side banks on a warm summer night, can have failed to admire it, and few there are probably who would not feel inclined to stoop and pick this "star of the earth" off the blade of grass up which it had crept, and carry it home to their garden where its presence might delight them for some evenings to come. Where the Glow-worm occurs, it is, generally speaking, very abundant, but although it is widely distributed through the counties of Northumberland and Durham, it seems in them to be more than ordinarily scarce, and the collector may search for some long time without being able to obtain a series for his cabinet.

In the early part of last July, I went into Gloucestershire, on a visit to some friends whose residence is among the Cotswold Hills, and there this insect was in the greatest profusion. Being in want of males, which are very much rarer always than the females, I went out several evenings in order to procure some specimens for my own cabinet, and some also for various friends. In obtaining that sex I was unsuccesful, probably I was a little too late in the season for them, but of the females (or females as I took them to be,) I could have taken almost any number, so abundant were they. As it was, I brought away with me a good many living specimens in my collecting bottle, but unfortunately on my way home I was obliged to remain for two or three days in London, and so for nearly a week did these poor Glow-worms remain in their prison, packed up among my luggage. When

I opened them out I found as I expected, several had died, but I still had plenty left to give away, and these were soon distributed.

I had never doubted for a moment, but that all I had collected were perfect females, for I confess I was quite ignorant of the larva being luminous, until a few evenings ago, when one of my friends, to whom I had given a specimen or two, brought me, to my surprise, a skin, which one of these insects had cast. And he observed that this individual specimen had not been for several evenings shining so brilliantly as usual, and on trying to discover the reason, he found the insect in the act of changing its coat. The only conclusion that I could arrive at was, that the insect in question was in the larva state, and I therefore examined two or three that I had left, and discovered at once that they were all larvæ. The only difference to the ordinary observer between the larva and perfect female being, that the former has a distinct white spot on the outer edge of each segment of the abdomen, while the latter is of a uniform dull brown colour, and spotless. I then referred to the various books I had at hand, to satisfy myself on the fact of the larva being luminous. Kirby and Spence, in their chapter on luminous insects say, "If you take one of these Glow-worms home with you for examination, you will find that in shape it somewhat resembles a caterpillar, only that it is much more depressed: and you will observe that the light proceeds from a pale coloured patch that terminates the under side of the abdomen. It is *not*, however, the larva of an insect, but the perfect female of a winged beetle," &c., &c.; but a few pages on, these authors state that De Geer discovered the larva to be luminous. Westwood, in his "Modern classification of insects," after describing the female lampyris, says the larvæ, pupæ, and eggs are luminous, but enters into no details respecting them. Kiesenwetter, in his Coleoptera of Germany, also mentions the luminosity of the larva, but refers the reader to Ellis and Newport's paper "On the Natural History of the Glow Worm," in the first volume of the proceedings of the Linnæan Society. In this paper Mr. Newport who has paid a great deal of attention to the breeding of this insect, says, that

luminosity exists in the larva at the very moment that it quits the egg, and that he has repeatedly seen it at that early period of its life. That the light proceeds from two little lobes on the ventral surface of the twelfth segment of the abdomen, which are the only parts that transmit light. He has also noticed that this larva shines always more brilliantly when disturbed, and that a full grown larva, under such circumstances, will give out its light—which it seems to have some control over—almost as brilliantly as the perfect insect, and that it shines the whole night through, but always when undisturbed far less brightly than the perfect female.

This paper contains the most satisfactory statement on this subject, as well as the various other stages of the glow worm's life, that I can find. But to proceed, in Wilson and Duncan's Entomology of Edinburgh, the glow worm is also treated of at very great length, and the former of these gentlemen has likewise reared the larvæ from the eggs, and has described most fully their habits and modes of life; but he observed *no* luminous appearance whatever in them until they became pupæ. The eggs were laid towards the end of July, and the larvæ were hatched a few weeks afterwards, and underwent their transformations at the end of June in the following year.

I may here remark, that when I emptied the paper out of the bottle in which my glow worms had been confined, I discovered a few eggs attached to it, but the only remark I made on them, was that they were large for the size of the insect, and covered over and fastened to the paper by a glutinous secretion of a bright yellow colour. As I had no intention then of breeding the insect I flung the eggs away.

Although from the time of De Geer, it seems generally admitted by authors that these larvæ are luminous, yet it seems very singular that those who noticed this peculiarity have not made more particular mention or taken more notice of it. All I can say is that I have the larva before me, and I can see no difference whatever, between the light of it and of the perfect female, they seem both equally bright, and in my own opinion the light proceeds not only from the two lobes mentioned by Mr. Newport,

but also from the whole of the three last ventral segments of the abdomen, and it has the same power over its light as the perfect insect, namely, that it can withdraw it at pleasure.

I have made these remarks with the hope that some member of the Club, who takes an interest in these things, will make an attempt at rearing this larva—which I believe is no difficult task, as its food consists principally of small snails or slugs—now that the subject has been brought before his notice, and that in some future pages of the "Transactions" he will furnish us with a full, and complete account of the various stages of the life of the common glow worm.

XVI.—*Local Superstitions at Stamfordham.* By the Rev. John F. Bigge, M.A.

How rare it is to find any one who will allow that he is superstitious, and yet it is believed that every one is so, more or less. Who likes to hear a dog come and howl at his door at night? Who does not prefer seeing two magpies rather than one? Who would wish to be married on a Friday? Who is quite indifferent about spilling salt? Who likes to hear the death watch? My object in writing this is simply to preserve some strange superstitions, which have come to my knowledge since I resided in this parish. Some of these stories seem incredible, but the actors in many of them have been personally known to myself. As the great modern leveller and civilizer, the railway, goes through a district, it soon puts an end to these things, and as there is no knowing how soon we may have one through our district at Stamfordham, I thought it was better to collect together what matter of the kind I had, thinking it might amuse and instruct some of our members, and also with the view of inducing others to continue the same subject.

The majority of cases which I shall bring to your notice, both as regards man and beast, have reference to the art of healing.

I shall now relate some of the most efficacious ways of curing warts.

(1) Take a large black snail, rub the wart well with it, then throw the snail against a thorn hedge till it is impaled, and there let it die. (2) Count the number of warts, put as many pebbles in a bag as there are warts, throw the bag away; who ever picks up the bag will get the warts. (3) Steal a piece of meat, rub the warts with it, throw it away, and as it rots so will the warts. (4) Make as many knots in a hair as there are warts, throw it away, a cure follows. (5) Rub the wart with eel's blood.

Hooping Cough.—There are several cures for the hooping cough, or kink, or king, or chin cough; I shall mention some of the strangest. (1) Children have been brought from some distance to the lime kilns at Hawkwell, a quarter of a mile south of this place, and carried backwards and forwards through the smoke. (2) Mr. John Anderson, to whom I am much indebted for information on these subjects, told me that he remembered seeing a child of———put under the belly of an ass, and between its fore legs, as a cure for this distressing complaint. A pie-bald pony is also very efficacious. (3) Another plan is in putting a trout's head into the mouth of the child affected, and as these Sages say, "let the trout breathe into the child's mouth." (4) Another receipt is, to make porridge over a stream running from north to south. In a streamlet, near a spring head, which runs for about 50 yards due south, near West Belsay, in a field called Fool (Foul?) Hoggers, a girdle was taken and placed over this stream, running south; a fire was made upon the girdle, the porridge was cooked, and the number of candidates was so many, that each patient got only one spoonful as a dose. This history was told me by one of the recipients, it happened when she was a girl.

The Ringworm.—I was well acquainted with an old charmer of this obstinate complaint. His patients were obliged to come to him before sunrise. He took some soil in his garden, and rubbed the part affected, and uttered some words. A man can communicate this secret to a woman, and *vice versa*; but a man cannot tell it to a man, otherwise the spell would be broken.

A farmer's wife, who lived at Belsay Dean House, was one

night suddenly seized with a violent bleeding of the nose. Her husband was instantly dispatched to consult a familiar spirit, who lived at Black Heddon, which is nearly two miles distant. They both returned together, till they crossed a small stream; the wizard uttered some words to himself, and said, "I shall go no further; you will find your wife better when you get home." When the farmer got home, he found no improvement in his wife, he instantly returned to the village for further advice. His friend said, "Ah, I forgot that other stream nearer your house;" so they went both back till they crossed the second runner. He stopped and uttered the same words, and on reaching home, the patient had completely recovered Her husband considered the cure miraculous, "seeing that she had bled," to use his own words, "nearly a hand-basinful of blood."

The Stramp Streener or Strainer.—A person skilled in this art, stamps with the foot on the part affected, and after the first pang, it is said to be painless. W. R., of Belsay Lake House, stramped, for sprain, the arm of J. T., and cured her. The limb ought afterwards to be bound up with an eel's skin.

Toothache.—In former times, a pilgrimage was sometimes made from this place to Winter's stob, or gibbet, for a piece of the wood to rub the tooth with.

Heart-grown, or Bewitched, a term applied to a sickly puny child, who does not grow. Such a child must be brought to a blacksmith of the seventh generation; this must be done before sunrise. The child is laid naked on the anvil, the smith raises the sledge hammer as if he were going to strike hot iron, but lets it come gently on the child's body. This is done three times, and the child always thrives after this.

To Cure Sores.—Mrs. R., of Kyloe House, had a sore leg. Her servant, who was my informant, was dispatched to Mrs. —— of Eland Hall, to borrow an Irish Stone. This is a stone brought from Ireland, and never permitted to touch English soil. The stone was put in a basket, and carried to the house where the patient resided; the leg was rubbed with it, and it was cured. They all considered that it would have been still more efficacious, if it had been brought and used by an Irish person. Dolly B.,

of Black Heddon, possessed one. Mr. A., of Belsay Bank Foot, had another. People came many miles to be rubbed.

A boy hurt his hand with a rusty nail, near here; he was instantly sent to Winlaton, to see the Wise Man there. His directions were that the boy had to take the nail to a blacksmith, to be well filed and polished, and to be rubbed each morning before sunrise, and each evening before sunset; by doing this, the wound was cured. When any one is cut with a sickle, it is taken home, and kept well polished, that the wound may be healed.—*Vide*, Sir Walter Scott's "Lay of the last Minstrel," Canto iii. 23., when William de Loraine was wounded—

"She drew the splinter from the wound,
And with a charm she staunched the blood:
She bade the gash be cleansed and bound:
No longer by his couch she stood.
But she had ta'en the broken lance,
And washed it from the clotted gore,
And salved the splinter o'er and o'er."

It is more than probable that these notions, extend over a wide district, and are not confined to any one portion of the Northern Counties. I shall now proceed to mention superstitions regarding insects and beasts.

Bees.—It is never considered lucky to be the sole owner of bees. A man and woman, not man and wife, should be partners, if either should die, some one should go at midnight, tap each hive three times, and desire the bees to work for their new master or mistress, as the case may be.

Spiders.—It is considered very unlucky to kill them.

Yellow Hammers.—Boys have a superstitious dislike to this bird; when they find its nest they destroy it, saying—

Half a paddock, half a toad,
Half a drop of deil's blood,
Horrid yellow yowling.

I have found another version of this in Rodgers,—

Half a paddock, half a toad,
Half a yellow yeldin;
Gets a drop of devil's blood,
Ilk a May morning.

Rooks.—When rooks desert a rookery, it foretells the downfall of the family on whose property it is. It is a popular tradition that the rooks deserted the rookery at Chipchase, when the respected family of Reed left it.

A cock crowing in at a door, is an intimation of a visitor coming.

Friday is considered an unlucky day to begin any work, such as cutting a field of corn, hay, &c.

Blacksmiths will not light their fires on Good Friday. If necessity compels them to do anything in the shop, they will not bring fire in, but will make it by striking a piece of iron till it becomes red hot.

On Easter day, the sun, when rising, dances on the water; and oxen sit down on their knees on old Christmas day. E. J., when living at Bradford, near Belsay, sat up for the purpose of seeing them do so, and asserted he saw the phenomenon.

If a fresh inhabitant of the village of Stamfordham takes a good drink at the pant, he will reside a long time in the village.

First Foot.—The inhabitants in this district are very particular about first foot in the house on New Year's Day. Before any one of the family leaves the house, an unmarried person, not a woman, for that is unlucky, must bring something new into the house; it is often a shovelful of coals. Whiskey, I regret to say, is coming into fashion. My friend before alluded to, was first foot for a few years at a house near where he lived, which belonged to a blacksmith. He was considered a lucky first foot. One year some one else, by accident, was first foot. This was considered an ill omen ; during the hay harvest the house was broken open and half a sovereign was stolen. First foot ought to carry in something to burn ; if anything besides, so much the better. No fire is allowed to be taken out of the house on that day, and no one likes to lend salt.

Three raps heard before a death.—This was heard, some years ago, at Windy Walls, on the outside of the shutter of a window; a man belonging to the house, the same night accidentally fell off a cart after delivering corn and was killed.

Ghosts.—Not many ghosts or witches have been seen in these

parts. The renowned Silky has not been heard of for some years. She used to haunt Black Heddon and Belsay. At the latter place, an old tree is shown, called " Silky's Seat."

I was once attending a very old woman, named Pearson, at Welton Mill, the foundations of which, if they exist, are at the bottom of one of the Whittle Dean Reservoirs. The old woman told me, a few days before her death, that she had seen Silky, the night before, sitting at the bottom of her bed, dressed in silk. For a longer account of Silky, I must refer you to " Richardson's Borderers' Table Book;" Vol vii., Legendary Division, page 181, edition 1846.

Wraiths.—Esther Morton, of Black Heddon, was gathering sticks, and made out of the way of the farmer, on whose land she was, and whom she was on the point of meeting; suddenly she remembered that he was very ill, and could not be there. She returned home alarmed, and found that her neighbour had just died.

William Elliott, of Black Heddon, saw an apparition of Mary Brown pop across the fold yard, and disappear in a straw house. Remembering she was very ill, he made inquiries, being alarmed, and found that she had died at the very moment he had seen her.

Salt.—Salt is often put on a cow's back immediately after calving. Salt is also put upon a child's tooth which has come out ; it should be thrown into the fire, uttering the following words—

Fire, fire burn byen,
God send my tuith agyen.

Bread.—Never turn a loaf upside down, or a ship will shortly be in a similar position. A medical man must always cut the groaning cheese and loaf, after the birth of a child. Bread and Cheese are presented to the first person the christening party meets, on going to church.

Children's hands are never washed by some, till they do it themselves, by wetting them in water. Babies nails should always be bitten, or they are certain to become thieves, when they grow up.

Left leg stockings should be tied round the neck for a sore throat.

Need (probably Neat,) Fire.—When the murrain broke out

among the cattle, about eighteen years ago, this fire was produced by rubbing two pieces of dry wood together, and carried from place to place, all through this district, as a charm against cattle taking it. A fire was kindled, and the cattle driven into the smoke, and they were kept there for some time. Many farmers in this part of the country, I am informed, had the "need fire."

Witchcraft.—Silver is always considered an antidote. Always shoot at a witch, if you wish to hit her, either with a crooked sixpence, or with one having a hole through it. Some persons are said to have an "Evil Eye," and do much harm therewith; if they look at any one churning, butter will never come. Mrs. C.'s (of Welton), servants could not get the cream to become butter, it was remembered that old Mally had looked in at the door when they were at work; a crooked sixpence was put into the churn, and the butter came instantly. A holy stone hung behind a door, or a horse shoe nailed upside down is very common.

To draw blood above the mouth is a mode of breaking some spells. A tenant of Sir Charles Monck, who lived at Belsay Bank Foot, had a cow that got her leg broken, a horse got stuck, and a calf died of the quarter ill. All these misfortunes came upon him at the same time; there could be no doubt that somebody had bewitched these animals. At last, a new servant, quite a youth was blamed. A person, skilled in these things, told the farmer that he might break the spell, simply by drawing blood above the wizard's mouth. At foddering time, the farmer purposely quarrelled with the poor lad about some trifle, and before the boy knew what it was all about, he drew blood above his mouth by making his nose bleed, and scratching his face. To use a cant expression of the day, it was a "great success," and the farmer throve ever after.

The witch of Hawkwell was transformed into a hare. The trap hole in the door was well remembered where she used to bolt through when hard pressed. The young horses that fed behind her cottage were always disabled. A whin stone on the road side is shown, which was melted down by her sitting upon it.

Always sit cross legged when sitting at cards.

Legends.—A calf, with two heads, uttered the following words when it was born, and died immediately after: they relate to Fenwick Shield—

Twice burnt, once sunk,
And never more seen.

The popular belief is that the house is sinking. Some years ago part of the kitchen fireplace is said to have sunk a few inches; this I can easily believe, for on the south side of the house, there was a large decoy for wild fowl; after the water was let off, and the land drained, it is very probable that the soil would settle down, and cause a shrink in the building.

The Captain's Walk is a foot path from the Heugh Bridge, going eastward along the Pontside; a lady with a baby in her arms walks there and sings—

Hush a bah, baby,
Hush a bah bee,
T'was Captain Walter
That kill'd thou and me.

St. Agnes' Fast, Jan. 21.—To procure a sight of a future husband.—Eat nothing all day till going to bed, boil as many hard eggs as there are fasters, extract the yoke, fill the cavity with salt, eat the egg, shell and all, then walk backwards to bed, uttering this invocation to the Saint—

Sweet St. Agnes work thy fast;
If ever I be to marry man,
Or man be to marry me,
I hope him this night to see.

I add another receipt for the same object. Eat a raw red herring, bones and all. There can be no doubt that dreams and visions will be the result. Men sometimes try this plan to see a future bride.

The following story was told of J. P., who having fasted all day, eat one of these superstitious suppers. The first words he was heard to utter when he awoke were "I'll never do it more, never." He had dreamed that he had a grape (fork), and was employed digging up potatoes, and a huge black sow of tremendous size, was eating them up as fast as he could turn them up;

he had to work for his life to keep the voracious animal busy, or else he himself would have been devoured.

Haunted House, Dalton Hill Head.—This place once belonged to the family of Hedley, of Newcastle, who sold it to Mr. Collingwood, of Dissington. Some years ago, a woman, Mary Henderson, had sole charge of the house. Her sister was the wife of George Stephenson, the engineer. A gardener lived close by, and had a mastiff named Ball. In the house there was a closet which the housekeeper had the most positive orders never to open. Her curiosity, however, got the better of her prudence, and she told the gardener what she intended to do. He strongly advised her against it. She got an axe and broke open the door of the closet, and found a quantity of children's bones, some in hat boxes, some wrapped up in clothes. She fastened up the door and went to bed. At night she awoke, and heard strange sounds of people dancing and singing up stairs. She thought she would go and see what all the noise was about. She called the dog Ball from under the bed ; but he only whined, and was unwilling to follow, and showed symptoms of fear, when in general he was most courageous ; so she carried him in her arms upstairs and proceeded to the room whence the sound came. She entered and found the room empty ; an attic window was open. In the morning, she told the gardener of these strange doings ; he also had heard strange noises, and had been much disturbed during the night.

Lockerby Penny.—This is, I am told, an old flat piece of silver, about the size of half-a-crown, and is used to cure madness among cattle. It is put into water, and stirred about for some time, and the animal must drink the water. A cow was bitten by a mad dog at H. D., and the cow attacked an ass. A messenger was despatched to Lockerby for the penny ; £50 had to be deposited as security, that it might be returned. In this case the donkey lived, the cow died. The owner of the property where this occurred told me that he remembers finding a quantity of quart bottles, put away in a closet, and labelled "Lockerby Water." Not many years ago, it was sent for by J. Brown, of Trewick, near Belsay. This shows how strongly

superstition is implanted, considering there were no railways at that time, bad roads to contend with, and a very long way.

The following occurred on the *Border*, and was told me by a clergyman. An old woman related it in the following quaint way :—"A cow, belonging to a poor family, was taken ill, an' I was advised, ye ken, to gang to the minister—it was thought he might do something for her; so I gangs my wa's, and sees him, and says, 'Weel Sir, the cow's varra bad; could'nt ye come, and mak' a prayer o'er her.' After hesitating a bit, he said, 'Well, I'll come;' and he did come, and laid his hand on her shoulder, and said, 'If ye live, ye live ; and if ye dee, ye dee.' She mended from that moment. Some time after, the minister himsel' was taken varra ill; and the good woman thought she wad like to gang and see the minister. She saw him lying in bed, and put her hand on his shoulder, and looking at him, in a most solemn way, said, 'If ye live, ye live; and if ye dee, ye dee." The minister burst out laughing, and his throat got better from that moment, ye ken."

How to find out who poisoned the horse.—W. P. farmed Richmond Hill, and at the same time had the Hawkwell Brewery. He had a hind, F. C., with whom I was well acquainted. A cart-horse died suddenly—it was supposed from eating grains; but the farmer and his man fancied that some bad neighbour had poisoned it. The farmer mounted a horse, and rode as hard as he could to Newcastle, to consult Black Jack the wizard, who said that the horse had been poisoned, and that the poison had been put into the brewer's grains. The wizard, on receiving the sum of one pound, gave the following strange receipt for finding out the culprit:—The horse's heart was to be taken out, stuck full of pins, and burnt on a fire, in a room at the farmhouse, at midnight—every hole in the house was to be stopped up, key-holes, &c., but not the chimney, and the perpetrator of the deed would stand before them. The master and his man did as they were directed; and when the midnight ceremony was nearly ended, the servant looked out through a window, and saw a man, whom he well knew, walking straight to the house, for it was moonlight; but I need not say he never appeared before

them in the room. The next day the familiar spirit was again consulted, and he said he was confident that all the holes had not been stopped; and when a search was made, a round hole was found on the stairs, which communicated with the outside, and had been omitted, and thus caused the incantation to fail.

XVII.—*Local Superstitions.* By the Rev. H. B. Tristram.

Cure for a Wen.—The body of a suicide who had hanged himself in Heselden Dene was laid in an outhouse awaiting the coroner's inquest. The wife of a pitman at Castle Eden Colliery, suffering from a wen in the neck, following the advice given her by a "wise woman," went alone, and lay all night in the outhouse with the hand of the corpse on her wen. She was assured that the hand of a suicide was an infallible cure. The shock to the nervous system was such that she did not rally for some weeks, and eventually died from the wen. This happened about the year 1853, under my own cognizance.

Witchcraft.—In November of the year 1861, I was sent for by a parishioner, the wife of a small farmer, who complained that she had been "scandalised" by her neighbours opposite, who accused her of witchcraft.

These neighbours had lost two horses during the last year, and consulted "Black Willie" at Hartlepool, who assured them they had been bewitched. Following his advice they adopted the following means for discovering the witch. Having procured a pigeon and tied its wings, every aperture to the house, even to the keyholes, was carefully stopped, and pins run into the pigeon while alive by each member of the family, so as to pierce its heart. The pigeon was then roasted, and a watch kept at the window during the operation. The first person who passed the door would be the guilty person. This neighbour had the misfortune to be the first person who passed the window, and the family are firmly convinced she had exercised the "evil eye," though she is a comely matron not yet fifty years old. This happened in a village close to the Tees.

XVIII.—*Remarks on the Ornithology of the North Tyne.* By Edward Charlton, Esq., M.D.

The ornithology of the district around Hesleyside and Bellingham, does not, perhaps, present any remarkable features. The usual birds that are met with in semi-alpine districts, are found here; but there are, or at least were, within our recollection, many habitats for rarer species, which are now becoming scarce in England. The wooded valley of the North Tyne, affords shelter for many of the smaller song birds, while on the open and extensive moorlands that spread on every side, some of the less common birds of prey have been occasionally met with. Our intention here, is merely to note a few of these occurrences which have come under our own observation. More than thirty years ago, we remember a messenger coming to Hesleyside in great excitement, with the report, that an Eagle was feeding on a dead sheep, near the track that crossed Hareshaw from Woodburn. Since then, the Eagle has been but rarely heard of, but we are told, that last year, a young bird of this species, haunted Reedwater for the better part of the spring, when it fed upon the sheep that died so plentifully from starvation, in that backward season. It was several times fired at, and is supposed at last, to have been wounded and to have died.

The Osprey is still, we are glad to say, to be seen in North Tyne. A month or two ago, a fine bird of this species was seen fishing in the Tyne, opposite to Mounces, and he afterwards settled in the large fir plantation, north of that house. We are not aware, however, that the Osprey has ever built in this district, though many specimens, both adult and young birds, have been killed, chiefly about the head of the Tyne, within the last thirty years. The specimen at Hesleyside was shot at Kielder.

The Peregrine, the noblest of our British falcons, will soon be extinct in this country, owing to the unceasing war waged against it by keepers and egg collectors. The specimens in our own collection, were taken about twenty-six years ago, at Whickhope-linn, on the south side of the Tyne, but the bird bred till

within the last twenty years also at Wanneys Crags, and in several rocks further up the Tyne.

The miniature Peregrine, the sprightly, fearless little Merlin, still breeds on our higher moors, but is annually diminishing in numbers.

Not so, however, the Kestrel, for which bird we have obtained a sort of protection from the keepers, on account of its preying chiefly on mice. We can always, even at this day, find a Kestrel breeding in the wild gorge of the Seven-linns in Chirdon Burn.

The destructive Sparrow-hawk, is now becoming scarce.

We remember to have heard old sportsmen say that the Kite, or Gled, was once frequent in this district; where it is now, however, hardly ever seen. The only specimen we know of was found dead in Chirdon Burn, twenty years ago.

The common Buzzard, is common here no longer, and still scarcer is the Marsh Harrier, both of which birds, we can remember to have been not difficult to procure.

Thirty years ago, we could have pointed out half a dozen nests of the blue Hawk or Hen-Harrier; but now, it is only once or twice in a season that these birds are ever to be seen.

The rough-legged Falcons appeared in this district, one autumn, in great abundance. But we believe, they were equally common at that time, over the whole of England.

The beautiful long-eared Owl, is no longer persecuted here, and the same protection is extended to its rarer congener the short-eared Owl, which still occasionally breeds on our moors.

The great grey Shrike has been twice shot in this neighbourhood; but is nowhere common in Northumberland. In our mountain streams, the Water Ouzel is always to be found, and the Ring Ouzel, with its peculiar wild cry, less harsh, however, than that of the Field-fare in the breeding season, is to be found on most of our Crags.

The Raven formerly bred at Hareshaw linn, at Wanneys crags, at Whickhope, and various other localities. We believe they are now reduced to a single pair, which still hold their ground at the head of the Tyne.

Above thirty years ago, one of the Woodpeckers, the lesser spotted, was killed in Hesleyside woods, but the specimen was not preserved.

The Night Jar or Goat-sucker is still tolerably frequent, and sometimes alarms the belated traveller with its singularly mournful cries.

The King-fisher is but rarely seen, but is found occasionally all the way up the valley of the Tyne. During the hard winter of 1860, a king-fisher was observed to dash itself down three times in succession upon the clear ice of a little burn at Hawkhope, near Falstone. The bird was no doubt starving, and was attracted by a fish beneath the ice.

The Grasshopper Warbler is frequent, and all the species of Titmice are to be met with in the woods.

The common Crossbill often haunts the pine plantations in immense flocks, but has not, we think, been known to breed here. The Siskin is found here all the year round. Of game there are the usual species; but we may mention, that it is only within the last forty years that Black-game have become as abundant as they are at present. At that time too, Pheasants were extremely rare. We have heard an old sportsman tell in our youth of the sport they used to have in the early spring, going out "a cocking," *i. e.*, shooting the cock-grouse when he was calling; just as the Norwegians destroy the Capercailzie at the present day. We possess a good specimen of the old grey hen assuming the plumage of the black cock. It was shot about eighteen years ago, out of a flock of black game at the feeding place, above the keeper's house. The other birds, were observed by the keeper to be persecuting this one.

The Quail is occasionally killed here by sportsmen.

The Bittern has been shot within a few years, upon the Reed. On the extensive morasses to the south-west the Redshank and the Dunlin still breed, and the Godwit (black-tailed), has been likewise killed.

We possess a fine specimen of the great or solitary Snipe, which was shot in 1836 at Buteland. The bird was so fat that it burst open when it fell. An albino variety of the common Snipe, of a cream colour, was killed at Clintburn in 1838.

Of water fowl, properly so called, we have very few varieties. The Barnacle Goose has been killed here on one occasion; and swans and wild geese frequent the lakes to the south and east; but hardly ever stop at the river. The wild Duck, and common Teal breed sparingly on the moors; and in hard winters the golden-eyed Garrot, the red-breasted Merganser, and the Goosander are by no means uncommon.

Some years ago, a fine specimen of the genuine Arctic Lestris was shot by Mr. Allgood, of Nunwick, on the Chirdon moors, and is now in that gentleman's possession.

The lesser black backed Gull breeds on a moss some miles to the north of Bellingham.

We have merely drawn up these notes from memory, after having had little opportunity of studying personally of late years the ornithology of this, our native district.

XIX.—*Curious instinct of Wasps.* By Thomas John Bold.

Whilst searching for insects, near Little Benton, on the evening of the first day of August, I noticed great numbers of Wasps very busy amongst a bed of the common thistle (*Carduus pratensis*), and on looking closely to their proceedings was much surprised to find that, instead of their being, as usual, in search of insects, they were feeding upon the sap of the thistles; and moreover had themselves cut off the thistle heads to come at the enclosed sap. Now the act of cutting off the thistle heads, with intent to procure food, may seem too near an approach to reason for a wasp, but we must recollect that the whole tribe to which they belong are celebrated for their instincts. One wasp I saw in the act of decapitation, having gnawed the stem in two, about one inch below the head. The colony of wasps (*Vespa vulgaris*) was in a hedge row, contiguous to the bed of thistles; and I watched their proceedings for some time to ascertain if this was an accidental or a usual means of procuring food. I think the latter, for they flew direct from the nest to the thistles, alighted on the stem, ran up until they came to the headless and bleeding

part, then passing their mouths carefully over it, appeared to lap up the exuding sap, visiting others in succession until satisfied, (much in the manner of bees visiting flowers), and then direct back to their home. This proceeding I saw repeated again and again. The thistles could not, I think, have lost their heads accidentally, as many that were so mutilated were much below their fellows, and were found scattered over the bed, which was many yards in length.

XX.—*Description and Analysis of an undescribed Mineral from Jarrow Slake.* By E. J. J. Browell.

I received some time ago, from Mr. Howse, a specimen of a mineral found during the excavations for the docks at Jarrow Slake. At his request I made an examination of it, of which the following is the result :—

Physical Properties.—Of a doubtfully crystalline or regular form, I think doubly prismatic; yellowish colour; very porous and friable.—Specific Gravity, 2·48; irregular fracture; has a dull, roughish, earthy surface. The specimens of crystals were more or less covered with silt, sometimes quite enveloped by it, so as completely to hide their form; and owing to their porous nature, the silt, in many cases, penetrated quite into the interior of the mass. Their chemical composition is as under.

First sample analysed, (a.)

Carbonate of Lime	95·15
Carbonate of Magnesia	3·73
Insoluble Residue, (silt, &c.)	1·53
Moisture	·53
	100·94

Second sample, (b.)

Carbonate of Lime	91·53
Carbonate of Magnesia	3·55
Insoluble Residue, (silt, &c.)	3·73
Moisture	·40
	99·21

If we then eliminate the silt and moisture as being accidental and non-essential constituents, we have, as the composition of the pure mineral,

	a.	b.
Carbonate of Lime	96·22	96·26
Carbonate of Magnesia	3·78	3·74
	100·00	100·00

The properties and composition of these samples seem to me to differ from those of any previously described mineral, and therefore, for the present at all events, regarding it as new, I propose for it, as identifying it with the locality, the name of *Jarrowite*.

XXI.—*Remarks upon the Preservation of Animals.* By William Green, Jun.

It has frequently struck me that many interesting facts relating to natural history and other subjects which come within the scope of this Society's notice are lost sight of from appearing in newspapers and other publications in the shape of brief paragraphs and notices, to be read and forgotten.

To a Society like ours, whatever is doing towards the preservation, propagation, and acclimatisation of animals and plants cannot be without interest; and here I would call attention to the remarks made in the Annual Address of the 29th March, 1860, by our late able President, the Rev. H. B. Tristram, where he deprecates the wanton destruction of every rare bird that appears in this country. Would that a wider circulation were given to them than is afforded by our publications.

Every true lover of nature cannot but deplore this wanton destruction which goes on around us; scarcely do we take up a newspaper in which paragraphs similar to the following do not meet the eye:—

"Two spotted Woodpeckers were shot in the Dill Plantations last week."—*Durham Chronicle*, 10*th May*, 1861.

"A Buzzard was shot at Hart, near Hartlepool," *August*, 1861.

Can nothing be done by this Society, which is daily becoming more powerful in numbers, influence, and scientific attainments, for the protection of the feathered strangers?

The Fauna of our islands is notoriously small; in fact, the late lamented Hugh Miller says, "our present fauna is the fragment of one once much more magnificent." Associated with species which still exist in the less cultivated parts of this country, such as the badger, the fox, the wild cat, the roe, and the red deer, we find the remains of great animals whose congeners must now be sought for in the intertropical regions.

Associated, too, with the works of man of the earlier periods, we find in our mosses equally suggestive remains of extirpated, and in some cases of extinct animals, such as gigantic skulls and horns of the *Bos primigenius*, or Native Ox, and of the *Cervus megaceros*, or Irish Elk, with the skeletons of wolves, of beavers, of reindeer, of wild horses and bears.

We find it stated by Hector Boece in his history, that there were beavers living among our highland glens even in his day, as late as the year 1526; but there rests a shadow of doubt on the statement. It is unquestionable, however, that the Gaelic name of the creature *Lesleathin*, or broad tail, still survives; and equally certain that when Baldwin, Archbishop of Canterbury, journeyed into Wales towards the close of the twelfth century to incite the Welsh to join in the Crusades, the beaver was engaged in building its coffer dams and log houses in the river Teivey, Cardiganshire.* The wolf and wild horse maintained themselves, in at least the northern part of the island, for several centuries later.

Our present fauna, however small, is unfortunately becoming less. Birds once common, and which would still be so, but for ignorant gamekeepers and thoughtless gunners, are ruthlessly

* See a valuable paper by Dr. Wilson, in the Transactions of the Berwickshire Club, vol. iv. p. 81, in which it is stated, that "Among the tolls licensed to be levied at Newcastle-upon-Tyne, in the time of Henry I., we find the *tymbra beveriorum* fixed at fourpence; and this, it is important to note, appears to have been an export duty.—*Secs. T. N. F. C.*

shot. Among them may be enumerated the peregrine falcon, great bustard, raven, hoopoe, ruff, capercaillie, quail, and many others.

Were it deeply impressed upon our minds that nothing is created without a purpose, and that the destruction of a single species of animal or plant may entail upon mankind the most serious loss and inconvenience, we should be more chary of indulging our murderous and destructive instincts.

Happily, it is in our power, not only to preserve the species we have, but, by the acclimatisation of those of foreign countries, to increase them. This is now being done by France and some other nations.

So serious has become the loss in France to agriculture by the wholesale destruction of birds, that the Corps Legislatif have been petitioned, that steps may be taken for the preservation of those birds that destroy insects detrimental to agriculture. The subject has been brought formally before the French Senate, and is now before the French Government in the form of a report.

The *Times* remarks "that the poverty of the French harvest this very year, 1861, is attributed to the ravages of a particular worm, which it is the function of a certain bird to destroy."

From *All the Year Round* I have extracted the following relating to the report:—

"The inquiry has been conducted with an elaborate accuracy characteristic of French legislation. Insects and birds have been carefully classified, according to their several species; their habits of feeding have been closely observed, and the results ascertained and computed. It has been concluded that by no agency, save that of little birds, can the ravages of insects be kept down. There are some birds which live exclusively upon insects and grubs, and the quantity which they destroy is enormous. There are others which live partly on grubs and partly on grain, doing some damage, but providing an abundant compensation.

A third class, the birds of prey are excepted from the category of benefactors, and are pronounced, too precipitately, we think, to be noxious, inasmuch as they live mostly upon the smaller birds.

If the arrangements of nature were left undisturbed, the result would be a wholesome equilibrium of destruction. The birds would kill so many insects that the insects could not kill too many plants. One class is a match for the other. A certain insect was found to lay 2,000 eggs, but a single tomtit was found to eat 200,000 eggs a-year. A swallow devours about 543 insects a day, eggs and all. The hedge sparrow devours per day some 550 insects. A sparrow's nest in the City of Paris was found to contain 700 pairs of the wing cases of cockchafers, though of course in such a place food of other kinds was procurable in abundance. It will easily be seen, therefore, what an excess of insect life is produced when a counterpoise like this is withdrawn, and the statistics before us show clearly to what an extent the balance of nature has been disturbed.

A third and wholly artificial class of destroyers has been introduced. Every Chasseur during the season kills, it is said, 100 to 200 birds daily. A single child has been known to come home at night with 100 birds' eggs, and it has been calculated and reported that the number of birds' eggs destroyed annually in France is between 80,000,000 and 100,000,000. The result is that little birds in that country are actually dying out, some species have already disappeared, and others are rapidly diminishing. But there is another consequence. The French crops have suffered terribly from the superabundance of insect vermin. Not only the various kinds of grain, but the vines, the olives, and even forest trees, tell the same tale of mischief, till at length the alarm has become serious. The loss occasioned to the wheat in one single year, in one department of the east of France, by one sole species of larvæ, is estimated at £160,000 at the very least. To this insect are to be attributed the scanty harvests of the three years which preceded 1856. In Germany the Nun Moth (*Psilura monacha*), has caused whole forests to perish. Three years ago, in Eastern Prussia, more than 24,000,000 of cubic metres of fir wood were obliged to be felled, solely because the trees were dying from the attacks of insects. Birds are now likely to be protected, indeed, their rise in estimation has been signally rapid. Some philosopher has declared, and the report

quotes the saying as a profound one, "that the bird can live without man, but man cannot live without the bird." Among the many very useful birds may be named the common and rough legged buzzards, which are said to each consume 6,000 mice per annum. It could be wished that the report from which the above is extracted were more generally known in this country, especially by those farmers who patronize the poisoned wheat now so extensively advertised.

The authorities of Lyons have issued a decree against boys being permitted to meddle with birds' nests in that department, and parents as well as schoolmasters are rendered responsible for any such delinquency of these juveniles."

A move in the right direction has been taken in the State of New York, North America, where a society has been formed for the preservation of the wild animals with which the rivers, lakes, fields, and forests are stocked, and for the prosecution of offenders against the law for the protection of fish, deer, and various birds during the breeding season, which the club was influential in passing through the State Legislature.

At a late agricultural meeting at St. Gallen, in Switzerland, Baron von Tschudi, the celebrated Swiss naturalist, dwelt on the important services of birds in the destruction of insects. Without birds, said he, no agriculture and vegetation are possible. They accomplish in a few months the profitable work of destruction which millions of human hands could not do half so well in as many years; and the Baron therefore blamed in very severe terms the foolish practice of shooting and destroying birds, which prevails more especially in Italy, recommending, on the contrary, the process of alluring birds into gardens and cornfields; and among the most deserving birds he counts swallows, finches, titmice, redtails, &c. For the protection of orchards and woods, titmice are of invaluable service. They consume, in particular, the eggs of the dangerous pine-spiders. M. Tschudi considers sparrows to be very useful birds, as one single pair usually carry to their nest every day about 300 caterpillars, an advantage that amply compensates for the cherries the birds steal in the garden. Owls also consume, morning and evening, vast quantities of wood insects.

Some species of birds, such as starlings, jackdaws, rooks, jays, and speckled magpies, are distinguished for destroying maybugs or cockchafers. A movement in the same direction has recently taken place in our own country, in regard to the preservation and propagation of salmon. For the former, the Salmon Fisheries Act has been passed, and towards the latter, breeding ponds have been successfully established upon the river Tay, in Scotland.

Darwin, in his Origin of Species, when speaking of the wonderful dependence of animals and plants upon each other says, "in Staffordshire, on the estate of a relation, where I had ample means of investigation, there was a large and extremely barren heath, which had never been touched by the hand of man; but several hundred acres of exactly the same nature had been enclosed twenty-five years previously and planted with Scotch fir. The change in the native vegetation of the planted part of the heath was most remarkable, more than is generally seen in passing from one quite different soil to another; not only the proportional numbers of the heath plants were wholly changed, but twelve species of plants (not counting grasses and carices), flourished in the plantations, which could not be found on the heath. The effect on the insects must have been still greater, for six insectivorous birds were common in the plantations, which were not to be seen on the heath; and the heath was frequented by two or three distinct insectivorous birds.

Another extract, I cannot forbear making, "From experiments which I have lately tried, I have found that the visits of bees are necessary for the fertilisation of some kinds of clover (*Trifolium pratense)*, as other bees cannot reach the nectar. Hence I have very little doubt, that if the whole genus of humble bees become extinct or very rare in England, the heartsease and red clover would become very rare or wholly disappear. The number of humble bees in any district depends in a great degree on the number of field mice, which destroy their combs and nests. Now the number of mice is largely dependent, as every one knows, on the number of cats, hence it is quite credible that the presence of a feline animal in large numbers in a district might determine, through the intervention first of mice and then of bees, the frequency of certain flowers in that district."

The displacement of one species by another species of the same genus is noticed by Darwin as follows:—

"We see this in the recent extension over parts of the United States of one species of swallow having caused the decrease of another species.

"The recent increase of the missel thrush in some parts of Scotland has caused the decrease of the song thrush.

"Again, the endemic productions of New Zealand are perfect, one compared with another; but they are now rapidly yielding before the advancing legions of plants and animals introduced from Europe.

"The red legged partridge, according to the Rev. F. O. Morris, where naturalised, has had the effect from some cause of banishing the indigenous partridge, and I think I have recently seen it stated that the swift in some districts in this country is giving way to the swallow."

Among the objects of the French Acclimatisation Society, established by a few energetic and learned men in 1854, is—

"1st. The preservation of useful animals, precious gifts which we have received from nature, and which we often lose through our ignorance, and especially through our carelessness.

"To take care of what we have is such common-place wisdom, that it seems strange to recommend it in these enlightened days, yet the barbarism of past ages still stalks erect amidst the civilisation of the nineteenth century.

"Man amuses himself more than ever in destroying the benefactors which nature has presented to him, and which he might retain by simply abstaining from mischief.

"The war which man wages, under pretence of shooting and fishing, against every animal he is able to destroy, is as fierce as it was during the middle ages, and is aggravated by the possession of more destructive arms."

In conclusion, I would observe that the subjects brought forward in this paper are by no means exhausted, and it is to be hoped that not only will they be followed up by more competent members than myself, but also by practical action on the part of this Society.

XXII.—*Notes on the Fossil Remains of some recent and extinct Mammalia found in the Counties of Northumberland and Durham.* By Richard Howse. (Pl. IV. and V.)

Very few instances are yet put on record of the occurrences of Mammalia in a fossil state in these counties. A few years ago my attention was more particularly directed to this subject by the discovery, in the neighbourhood of Shields, of remains of some of the now extinct larger ruminants. In the following notes I have endeavoured to bring before the club, not only these discoveries, but also all the other authentic information I have been able to collect, hoping it may induce those of our members who may have any information of this nature to record it in the transactions of the club.

Compared with more southern localities, the number of species we have met with is extremely meagre. As yet very few traces have occurred of those great Pachyderms, whose remains are so prevalent in Yorkshire and other parts of the eastern coast. Ruminants form the characteristic group of this ancient fauna; and we have now recorded, for the first time, I believe, the occurrence of the true Elk in the fossiliferous deposits of England. The occurrence of the Irish Elk also on the banks of the Tyne is of considerable interest, as it is, I believe, the highest latitude at which remains of this gigantic deer have been noticed.

Further researches will, no doubt, make us acquainted with a greater number of species; indeed, since commencing this paper, I have heard of the discovery in Weardale of a species of cave carnivora in the once celebrated Heathery Burn Cave. The specimens discovered in this case, human and carnivorous, have been sent, I am informed, to London, for the purpose of being properly identified and recorded in some scientific periodical.*

1. Mammoth, *Elephas———?*

A portion of a small tusk was found during the excavations of the docks at Hartlepool; but the exact geological position in which it was found, I have not been able to ascertain.

* Geologist, vol. V., p. 34, et seq.

2. Wild Boar, *Sus scrofa*, Linn.

Very few instances of the occurrence of the wild boar in a fossil state have, up to the present time come under my notice. This is perhaps the more remarkable, as so many traditional reports of its former existence during the historic period have been handed down to us. The following is, perhaps, the most remarkable, and may have been the source of all the brawn stories of this and neighbouring counties. "A Roman altar is preserved at Stanhope Rectory, found on Bollihope Common, with this inscription:—*Silvano invicto sacrum C. Tetius Veturius Micianus præf. Alæ Sebosianæ, ob aprum eximiæ formæ captum, quem multi antecessores ejus prædari non potuerunt. Votum solvens, lubenter posuit.*—(Hutchinson's Durham, vol. iii., under Stanhope; Gent. Mag. Oct. 1749, p. 449.) But it is satisfactory to know that it has been found in one or two places in deposits which have some claim to be considered at least prehistoric.

Teeth of the wild boar, associated with skeletons of the red deer, have been found in a lacustrine marl beneath a bed of peat at Middleton bog, near Wooler. This lacustrine marl, which is about eight feet in thickness, rests on the boulder clay and gravel of the district, and is covered by a deposit of peat two to four feet thick. Numerous remains of freshwater shells belonging to the genera, *limnæa*, *succinea*, *planorbis*, *valvata*, and *cyclas* have contributed to form this bed of marl, which no doubt indicates the site of an ancient lake.*

The Rev. Wm. Greenwell has obligingly reported to me the occurrence of the cranium of a wild boar, which was dug up at the depth of thirteen feet, in making the main drain in the North Bailey at Durham. It was embedded in alluvial sand with remains of red deer.

The fine boar's head on the table is of interest only from the circumstances under which it was found. It was discovered during the sinking of a well in the blown sand which covers the top of the Trow Rocks, near South Shields. On examining the

* Proceedings of the Berwick Nat. Field Club, 1860.

skull we see indubitable proofs of the vile manner in which this poor creature lost his life; but it is not so easy to account for its entombment at so great a depth in what appeared to be undisturbed sand.

3. Horse, *Equus*———.

Two molars belonging to the under-jaw of a horse have been discovered by Mr. John Hancock and Mr. Atthey in the peat deposit at Prestwick Car; but more perfect information is desirable, in order to be able to attest the antiquity of the species.

4. Elk or Moose, *Cervus Alces*, Linn. (Plate V.)

The former existence of the true Elk or Moose Deer of the Canadians, in our district, indeed, I may say in England, for its occurrence in any of the fossiliferous deposits of South Britain has not yet been recorded, rests upon the authority of a very fine antler presented to the Natural History Society by Mr. Walter Dodds, Hope House, North Tyne.

Dr. Charlton, through whose kindness it was presented to the Museum, has obligingly informed me that it was found in Chirdon Burn, near the bottom of the recent Peat formation, resting, partially on the coarse gritty marl formed by the weathering of the subjacent strata. The antler appears to have been partially exposed and damaged some time prior to complete disentombment. It has received more serious injury from being suddenly removed from the moist peaty marl to ornament the fireplace of the farmer's kitchen.

The perfect preservation of the outer rind or periosteum of the antler, and its dark colour, are most probably due to the tanning properties of the peat. The interior bony portion seems to be quite destitute of animal matter, and though no great antiquity can be claimed for this specimen, it has evidently undergone the first steps towards fossilisation. The perfect appearance of the burr or boss shows it to have been shed, and the number of points or digitations indicate it to have belonged to an individual six or seven years old, and therefore immature, as it is said the elk does not complete the growth of its horns till the fourteenth year.

The antler measured, when perfect, from tip to tip, two feet, and from the burr to the farthest point, about two feet ten inches, round the burr ten inches, and round the beam nearly eight inches.

In the Proceedings of the Berwickshire Club, 1860, p. 208, Mr. Hardy figures a portion of the antler of a deer, which he believes to belong to the great Irish elk. We are inclined to think, from the drawing which accompanies his paper, that it belongs to the true elk. This fragment was found near Coldingham, at the depth of six feet, amidst a deposit of gravel, earth, and large boulders, similar in appearance to those collections of waterworn stones and pebbles that underlie the common soil in many parts of Berwickshire.

The occurrences before-mentioned probably belong to the prehistoric period, but the following quotation, if it may be relied on, would lead us to infer that the true elk has existed in this island at a much later date. In Maxwell's Hillside and Border Sketches (vol. I. p. 317), it is said that a medal of Trojan, a patera, a fibula, and a moose deer were discovered near North Berwick.

There is no historical account of the former existence of the Elk, as a native of Britain, by any Roman author; but it is, on the contrary, mentioned particularly by Cæsar as living in the great Hercynian forest during the Roman period. With the progress of civilization, it has gradually disappeared from the countries formerly covered by this extensive forest, and occurs now in Europe, only in Northern Prussia, Lithuania, Finland, Russia, and Scandinavia. It ranges also through Northern Asia; and, under the name of Moose-deer, through the wooded districts of British America and the secluded districts of the States.

5. Great Irish Elk, *Megaceros Hibernicus*, Owen. (Pl. IV.)

In the winter of 1855-6 the remains of an imperfect skeleton of the great Irish Elk were discovered in a brickyard at South Shields. The workmen in digging clay at rather a lower level than usual, came unexpectedly upon an intercalated bed of peat, which proved to be, on further examination, a foot in thickness, and of very

solid structure. Under the peat, and resting on marly clay, they met with the remains of the above-mentioned deer. Portions of an entire skeleton were exhumed, but some parts were in a very fragmentary condition. These interesting remains were unfornately packed off to the Crystal Palace before I had an opportunity of seeing them, but were identified on their arrival there by Mr. Waterhouse Hawkins. From the description of the workman who discovered these remains, I ascertained that the most perfect antlers measured about three feet, and from Mr. Hawkins I ascertained that the skeleton sent to him indicated an individual of the average size.

From a careful examination of the place, I came to the conclusion that the peat had not grown on the spot, but had been washed from a distance and deposited in a small depression of the alluvial clay, which was occasionally overflowed by the Tyne during extraordinary floods. It appears also probable, from the fragmentary state of the skeleton, that it also had been floated from a distance and cast up on the alluvial clay with the peat by which it was covered. There was no regular accumulation of marl, that I could trace under the peat, to lead to the conclusion that a lake formerly existed at the spot where the bones were found. I hope, in future, to have a better opportunity of examining this section; at present it is covered with water.

The bed of clay above the peat was about twelve feet thick, and the surface of the brick-yard is now more than twenty feet above the high water level of the Tyne. The thick deposit of clay, and the present elevation of the surface may indicate alterations in the levels of the adjoining country, but we require more careful observations, before we can generalise satisfactorily, on this very difficult question.

The Rev. W. Greenwell has obligingly communicated to me, the discovery of a pair of horns belonging to this species, which were found after a storm, and supposed to have been washed out of a bed, containing remains of trees near the Snook Point, at the mouth of the Tees. They are carefully preserved in the University Museum, Durham, and form an additional proof of the former existence of this huge deer, and at a comparatively

recent geological period in this district. The best preserved specimen (Pl. IV.), has the brow and bez antlers, finely preserved. Both horns were shed, and probably belonged to the same individual.

The third pair of antlers belonging to this species are remarkable as being the first found in England. They have been mentioned by our local historians, as belonging to the Moose-deer. They were discovered in 1740, five or six years before the Cowthorpe specimen. That inaccurate observer, Mr. Cade, first noticed their occurrence in the seventh volume of the Archæologia, p. 74, in the following words :—"Secondly, there is a large cavity on the summit of the camp at Mainsforth, which is at this day called Danes-hole, where there was lately dug up a pair of Moose-deer horns of an extraordinary size, probably brought from Ireland by Anlaf, as they seem peculiar to that kingdom."

Mr. Hutchinson (Hist. Durham, Vol. iii., p. 83), corrects Mr. Cade as to the locality in which the horns were found, but probably errs in supposing that they were brought to this country "for show or curiosity." He gives also several dimensions of the horns, and a figure sufficiently accurate to enable a naturalist to identify the species.

"The whole site of Nab-hill," says Mr. Surtees, "has been twice ploughed without discovering any reliques of its former tenants, save that in digging a small pond at the southern base of the hill, a pair of huge antlers belonging to the segh-deer was found bedded in the clay, four feet below the surface. One of these is preserved; it measures, from root to tip, three feet eight inches, and ten inches in circumference immediately above the root; the greatest breadth is fourteen inches; several of the branches are evidently broken off."—Hist. of Durham, Pt. 3, p. 21.

Thus, then, the former existence of this gigantic deer in this district is established by the threefold evidence recorded above; and the geological position of the remains is also satisfactorily determined, viz., on the weathered surface of the boulder clay, and beneath deposits of vegetable matter, washed from higher

localities. It is also nearly certain, from the manner in which these remains occur, that this deer inhabited the sub-alpine regions—the sources of the Tees, Wear, and Tyne.

6. Red-Deer, *Cervus elaphus*, Linn.

It might perhaps be expected from the comparatively recent extinction of the red-deer that remains of this species would be of frequent occurrence. Not only does it occur frequently, but the antlers are of great size, showing that in ancient times it attained its maximum and most noble proportions.

Remains of this species have been met with, in nearly all the lacustrine and æstuarine deposits examined, and also in most of the ancient buried vegetable deposits of the coast of Durham. Many years ago Mr. Hogg recorded the occurrence of deer bones from the alluvium of South Durham.* More recently, entire skeletons have been exposed by the sea, in the buried peat deposits between Hartlepool and Seaton Carew. Antlers have also been obtained from a similar deposit at Whitburn sands, and bones apparently appertaining to the same species were detected in the accumulations of peat, exposed during the drainage of Prestwick Car.

The excavations at Jarrow Docks afforded numerous remains of this species including several nearly entire skeletons. Indeed, in most instances, the antlers were found attached to portions of the skull, indicating, no doubt, the violent death of these noble denizens of the forest during severe winter storms. One or two instances of shed antlers occurred. Antlers belonging to individuals varying in age from the brocket, with a single tapering horn, to the full-grown or crowned stag, occurred.

In the Jarrow slake deposit, these remains were found from five to fifteen feet below the surface of the silt. Some of the bones were perfectly fossilized, others were so tender and friable as to fall to pieces immediately they were exposed. Most of the specimens were found near the mouths of two small denes that run into the Tyne, associated as in the case of the ox, we have to mention, with numerous fragments of forest trees, leaves, and land and æstuarine shells.

* Brewster's Hist. Stockton, App.

The country round Jarrow slake is now so utterly destitute of trees and shrubs, that we have some difficulty in imagining that in former times, thick hazle copses clothed the banks and hollows of the neighbouring denes, that willows, and alders of great size grew in the damper places, and extensive portions of the adjacent country were covered with forests of oak and Scotch-fir, in which we may presume

> "The rude axe with heaved stroke
> Was never heard the nymphs to daunt,
> Or fright them from their hallowed haunt."

Remains of this deer, consisting of the fragment of an antler of considerable size have been found on the banks of the Coquet, near Brinkburn, and the Rev. W. Greenwell reports its occurrence at Durham, where a portion of a cranium was found embedded with the remains of the wild-boar in a fine alluvial sand, thirteen feet below the present surface.

In the Proceedings of the Berwickshire club for 1860, the occurrence of skeletons of the red-deer, in a deposit of marl below a bed of peat at Middleton bog, in the neighbourhood of Wooler, is recorded. Here, they were associated with the teeth of the boar, and fresh water shells of existing local species. Our late lamented president has described very graphically, in a former volume of our Transactions, the occurrence of bones of the red-deer with those of human beings, from a deposit accumulated in the bed of the Wear.*

The following statement requires confirmation:—"Part of the horn of a red-deer (*Lepidodendron*, perhaps) was taken by the author from a block of freestone, got in Stainton Hill quarries." —Hutchinson's Durham, Vol, iii., App.

The final extinction of this species from the enclosed preserves of these counties probably took place during the early part of the last century. Hutchinson gives the following quotation:— "At Rood-day, 1673, there were above 400 red-deer in Teesdale forest, but were destroyed in the snow."

* Trans. Tyneside Nat. Field Club, Vol. iv., p. 117.

7. Great Fossil Ox, *Bos primigenius*, Bojanus.

During the excavations of the Jarrow Docks, I was so fortunate as to have the pleasure of examining a fine pair of horn-cores of that large bovine creature, which is now styled by English palæontologists, the Great Fossil Ox. Though very imperfect, and perhaps unsightly as specimens, they were the first undeniable proof I had met with of the occurrence of this species in our superficial deposits, and of the former existence of this truly formidable creature in the ancient forests that skirted the banks of the Tyne. So far as I was able to ascertain, only remains of two individuals occurred. They were embedded in the fine calcareous silt of the Slake, at a depth of seventeen feet, and fifteen feet below the line at which any traces of artificial remains had been observed. The horn-cores were found in connection with large irregular calcareous concretions which enclosed numerous remains of land and æstuarine shells, leaves, moss, and fragments of trees. One horn-core was partially surrounded by a calcareous nodule containing remarkably distinct impressions of oak leaves.

Some years ago Mr. Thomas Gray presented two horn-cores of an ox to the Museum, which were dug up in sinking a well at the Salt Marshes out of the alluvium at considerable depth. They are both in a very fragmentary condition, having been much worn and rubbed by the action of water. The larger specimen though it differs considerably in the curvature of the horns from the Jarrow specimens, I feel inclined to refer to the original wild ox, *Bos primigenius*. It belonged probably to the male of that species, the horn-cores being somewhat shorter, and the frontal portions of the cranium more massive than those of the individual found at Jarrow. The distance between the horn-cores of this specimen is nearly ten inches, and the greatest circumference of the horn-core about nine inches. The horn-core also has not the characteristic graceful curve of the wild ox. These characters assimilate it in some degree to the later domestic varieties.

The other horn-core found at the Salt Marshes, said to be found with the former, and bearing mark of rubbing and wearing

by some transporting agent, belongs unquestionably to the historic period, very distinct marks of a saw, being still traceable on a portion of the skull. The form of the skull and its inferior dimensions indicate also its relationship to the domestic varieties.

Bos primigenius has been found in a fossil state in Scotland, and also in the South of England, attaining, according to recorded measurements of the largest individuals that have been discovered, a greater size in the South, than in the North. The specimens found in this district, though larger than those found in Scotland, do not attain to the size of the finest examples from the South of England. The Jarrow example, which we suppose to belong to the cow of this specie, measured, between the horn-cores, eleven inches, and round the base of the horn-core, thirteen inches. The specimen from the alluvial banks of the Tyne, and which we suppose to be referable to the ancient bull, measured only nine and a half inches between the horn-cores, and nearly ten inches round the core at the base.

Cuvier, Professor Bell, and many other eminent naturalists think that our domestic breeds have descended from this primitive wild stock, but it is to be regretted that several influential naturalists instead of subscribing to this sound opinion, have raised unnecessary and unsubstantial objections to it, and thrown the origin of our domestic race, as far as they have been able, into more than primæval obscurity.

Var. *Bos longifrons*, Owen.

Professor Owen has reported the former existence of what he believes to be another species of *bos*, indigenous to our island, to which the fragments below mentioned bear considerable resemblance. He also thinks that it is to this species, *Bos longifrons* and not to *Bos primigenius*, that we must look for the original of our domestic breeds, but, as in his remarks on *Bos primigenius*, the Professor conjectures it is more probable that the first colonists of these islands would bring their domestic cattle with them, than undergo the labour of reducing a primitive wild race to subjection, an opinion in which I think most will concur; it would seem a more probable opinion, notwithstanding the supposed antiquity of the deposit in which remains of

this variety have been found, to suppose that these fossils belonged to individuals that had strayed into the fastnesses of our country, and regained some portion at least of their original freedom.

A fragment of a skull, with the horn-cores, apparently belonging to this variety, was found during the excavation of the innermost dock at West Hartlepool, and is preserved in the Museum there, with remains of a mammoth, red-deer, and human beings.

A more perfect specimen, presenting the same characters as the above mentioned, is preserved in the Durham University Museum. It was found in digging a new cut for the Tees, twelve feet below the surface, in a bed of peat. It differs from our modern ox, so far as I can perceive, only in the greater diameter of the skull between the horn-cores. In Brewster's History of Stockton-on-Tees, p. 481, it is stated that part of a metal buckle, a stag's horn, *a bullock's head*, a dens molaris of some ruminating animal were found ten feet deep in clay. The above head appears from a memorandum attached to it, to be the identical specimen obtained from this cutting, referred to in this paragraph.

In the silt of Jarrow slake several fragments of the horn-cores with portions of the cranium, were found so similar in form to those of our domestic ox, that I hesitate to include them among those that are most certainly referable to the wild primæval ox, especially as I did not see what part of the silt they were obtained from, and the utter impossibility of relying on the information of workmen.

It is to be hoped that further searches will enable us to arrive at more definite conclusions respecting the last mentioned variety; and also increase numerically, this imperfect catalogue of our fossil mammalian fauna.

South Shields, December 23, 1861.

EXPLANATION OF PLATES IV & V.

Megaceros Hibernicus, Owen, found at Seaton Snook, Plate IV.
Cervus Alces, Linn, found in Chirdon Burn, North Tyne, Plate V.

XXIII.—*Analyses and Description of Magnesian Limestone, from the Trow Rocks.* By Robt. Calvert Clapham.

Read December 23, 1861.

At our Last Field Meeting, held on the 18th of October last, at Marsden Rocks, a discussion arose on walking along the Coast, as to the cause of some very marked and distinct changes or decompositions in the Magnesian Limestone, which are seen most clearly at the Trow Rocks, where the quarrying is now going on. The beds of limestone worked in the quarries belong to the Middle Bed—the Concretionary, or Cellular limestone of Sedgewick,*—and appear here to consist of two main divisions. The upper bed is dark coloured, compact and crystalline, (No. 1) and the lower bed is of a light cream colour, (No. 3) much softer than the upper bed, and can easily be cut with a knife, and is non-crystalline. These beds again are divided into two other beds, one lying immediately below the upper and crystalline bed, and consisting of a soft clay-like limestone, (No. 2) which can be easily moulded with the hands, and is of a rusty colour, and saturated with water. The other bed (if bed it can be called, as it is very irregular), consists of a conglomerated limestone, which is rather curious, as both from appearance and from analysis, I find it to consist of the hard crystalline limestone of the upper bed, and pieces of the soft cream-coloured limestone of the lower bed intermixed with it. These cream-coloured pieces of limestone are subject to easy decomposition from causes which will be explained, and in many cases appear as a soft, whitish clay, and in other cases are entirely removed, and leave hollows in the rock of various shapes and sizes. By exposing the upper (crystalline bed) to water, even for some weeks, it is not at all acted on, but remains perfectly close and hard; but when the lower bed (cream-coloured and non-crystalline) is exposed to water for even a few days a change takes place, and it begins to crumble into a fine soft mud. This is more rapidly effected when the water is slightly warmed. The water which

* See Notes on the Permian system of Northumberland and Durham. By Richard Howse. Transactions, Vol. III., p. 235.

constantly percolates through these beds of limestone undoubtedly has much to do with their physical and chemical change, and with the object of ascertaining how these changes were brought about, the following analyses were made:—

	No. 1.	No. 2.	No. 3.
Silica	1·62	10·00	4·50
Alumina	0·60	1·60	0·70
Peroxide Iron	0·50	4·21	0·80
Carb. Magnesia	4·79	35·33	27·00
„ Lime	91·50	49·50	67·00
	99·01	100·64	100·00

It will be seen that No. 2 (which is the soft clay-like limestone) contains the most silica and the most magnesia, but it is to the silica which I wish to draw your attention chiefly.

Limestones containing silicate of lime are easily acted on by carbonic acid contained in the air or in the water which percolates through them. The unaltered lower bed (No. 3) contains some quantity of silica, and I think it extremely probable that the soft clay-like bed (No. 2) has at one time been exactly similar in chemical composition to this lower bed, and that the water with which it is so largely charged, and which contains carbonic acid, may have decomposed the silicate of lime, removing the lime in solution, and leaving the silica behind, and in proportion as the lime is gradually removed the percentage of magnesia and silica will increase, which appears from the analysis to be the case. The cause of change, therefore, in this so-called middle bed, I think, may be accounted for, by the removal of the lime existing as silicate of lime, and in this way producing a soft and porous mass such as we find.

The action of water upon all rocks is well shown to be very great, but upon some limestone rocks it is something remarkable It is estimated, for instance, that the Rhine running through limestone rocks by its action on the silicate of lime in these rocks and otherwise, carries annually into the sea some 370 tons of limestone. A question like this soon makes itself of practical importance. Professor Ansted has recently told us in one of his lectures that the quarries of Dolomite, of which the Houses of Parliament are built, produce stone, apparently from the same workings, which is very differently acted on by the weather; and at Marsden we

appear to have an example of this, which a succession of chemical tests may expose.

Mr. Howse was good enough to direct my attention to a peculiar substance found in the magnesian limestone, which he thought to be flints. I have analysed these also, and find them to consist as under :—

Silica	78·00
Alumina	1·50
Peroxide Iron	
Carb. Magnesia	9·20
„ Lime	11·10
	99·80

It is therefore not a flint (properly so called) but a mineral, consisting of silica and carbonates of lime and magnesia, which may yet require to be named. It is possible that it may have existed as some organic substance, of which the present mineral may retain some of the original form.

Another specimen of a similar substance, but much more flinty in its appearance, found at Fulwell, and sent me by Mr. J. W. Kirkby, approaches much more nearly to the composition of flint in the quantity of Silica, but contains a greater per centage of other matters than that mineral. It is composed as under :—

Silica	96·5
Alumina and Iron	1·2
Carb. Lime	1·6
„ Magnesia	Trace
	99·3

The application of chemistry to geology may sometimes throw a little light on the decomposition or change of rocks, and I now lay these few results before you, trusting that investigations of this nature may not be altogether useless.

XXIV.—*Observations on a Species of Pycnogon* (Phoxichilidium coccineum, *Johnston*), *with an attempt to explain the Order of its development.* By George Hodge.

[Plates VI. & VII.]

The generation and development of the Pycnogonoidea, to the best of my knowledge, have hitherto received a very small share

of attention. Many naturalists, during their investigations, must have noticed and recorded certain facts bearing upon these points; but it unfortunately happens that these have either remained unpublished, or inaccessible to the ordinary student, who is therefore left to grope in the dark, and to rely upon his own observations and research, for any knowledge of this interesting subject that he may be desirous of obtaining. Little has been said of the anatomical differences of the sexes; we only know that most, if not all, of the females of the several species possess an additional pair of members, anterior to the ordinary feet. These members, known by the name of 'false feet,' differ in different genera, have been made an important aid in classification, and are furnished with a number of setæ, of forms varying according to the genus or, it may be, species; and near to these setæ, at certain periods, the eggs or ova are found.

We know nothing of the earliest stage, or means by which the ova are produced and fertilized; and, so far as I am aware, the subject has not been alluded to by any writer on these animals. The only published record to which I have had access is a paper by Kröyer in the 'Annales des Sciences Naturelles' for 1842, being "Notes on the Metamorphosis of the Pycnogonides," wherein the larval forms, as attached to the females of *Pycnogonum littorale*, *Nymphon grossipes*, and *Phoxichilidium femoratum*, are figured and described. I have also been kindly favoured by Mr. Spence Bate with some MS. notes "On the Morphology in the Development of the Pycnogonidæ," which were read at the British Association Meeting of 1855. These authors, however, go no further than the larval forms, and make no allusion to the subsequent stages through which the young animals pass before they attain the mature state; therefore the following observations, although imperfect in some most important particulars, may perhaps be the means of guiding others in the search, and thus ultimately lead to the complete elucidation of the development of the Pycnogonoidea.

The species that afforded me material for the following observations, and which I believe to be *Phoxichilidium coccineum*

(Johnston)*, may frequently be taken at low-water mark, crawling or, rather, sprawling over Algæ and Zoophytes, more frequently the latter. In most instances I have met with them on a muddy bottom, probably because the Zoophytes on which they seem to feed are found there. During a careful and systematic series of "rock-hunts," undertaken with the view of obtaining a collection of the smaller and rarer marine animals of this part of our coast [Seaham], I collected a handful of a species of *Coryne* (*C. eximia*, Allman) from a small rock-pool, under the shelter of the overhanging side of which depended a most interesting fringe of Zoophytes, such as *Coryne*, *Tubularia*, *Plumularia*, *&c.* The *Coryne* was very abundant; and many of the polyparies attained the unusual length of 3 to 4 inches, and were, at the period when taken (August), profusely covered with Medusoids in various stages of growth. As I collected these specimens, I noticed some peculiar dark brownish-red pear-shaped sacs scattered over the stems, more especially on the lower portions. Concluding they were some peculiar organisms connected with the growth of the *Coryne*, they did not receive more than a passing glance; but on arriving at home, the specimens were turned out

* *Orithyia coccinea*, Johnston. "Animal araneiform, slender, of a uniform fine clear red colour, with the joints of the legs and tarsi yellowish, and, when magnified, a central vessel, distinguished by its deeper tint, is seen running uninterruptedly through the body and legs: rostrum yellowish, porrect, cylindrical, somewhat thickened outwards, divided beneath by a mesial line shorter than the mandibles, which originate from the anterior margin of the first segment, and are biarticulate; the basal joint long, while the second forms a short ovate hand armed with two sub-equal curved claws: body 4-jointed, the first with an oculiferous tubercle; the eyes obscure: legs four pairs, with a few widely scattered short hairs; three times the length of the body, equal, 8-jointed; the basal joint short; the second somewhat longer than the third; the fourth slightly dilated, elongate; fifth and sixth slenderer, but as long; seventh minute; eighth rather long, falciform, spinous on its inferior edge, and terminated by a single rather long claw. [There are *two* claws: one is very small, and is rather difficult to see, from its position; it issues from the base of the largerclaw, near to its insertion into the falciform joint, and clings closely to it.—G.H.] Length of the body 2 lines, of the legs 6 lines. With a common magnifier, the body appears very smooth; but when a more powerful glass is used, it and the legs are seen to be roughish with minute granules." ("An Attempt to ascertain the British Pycnogonidæ," by Geo. Johnston, M.D., in 'Magazine of Zoology and Botany,' vol. i.) *Phoxichilidium coccineum*, Milne-Edwards, 'Crust.' vol. iii. p. 536, 1840. (Goodsir, in 'Annals and Magazine of Natural History,' vol. xiv. 1844.) *Nymphon femoratum* (Rathke, Nat. Hist. Skrifter, vol. i. p. 201). *Phoxichilidium femoratum*, Kröyer, in 'Annales des Sciences Naturelles' for 1842. In speaking of this species, he says, "I believe this animal identical with the *Orithyia coccinea* from the coasts of England."

into dishes, and by accident a hand-lens was applied to one of the dark-red sacs, when it was seen that the red colour depended principally upon a central portion, resembling in an extraordinary degree a small Pycnogon with very short legs. The sac was then ripped up; and the imbedded object, being extracted and gently freed from the investing mucus, proved to be a veritable young Pycnogon. Here was a discovery—a Crustacean (?) within a Zoophyte! Puzzled and surprised, I endeavoured to ascertain more of the extraordinary partnership (the benefit all on one side, I am inclined to think) that appeared to exist between the Coryne and the Pycnogon.

The natural inference on first finding these sacs would be that they had been attached by the mature Pycnogon—in fact, were the germs cemented to the polypary, and that the difference in form (pear-shaped, instead of globular as when attached to the false feet of the female) might be the result of growth. On submitting, however, the sacs to microscopical examination, their external appearance so closely resembled the growth of *Coryne*, and, on the other hand, was so totally different from anything that could be imagined to be the product of a Pycnogon, that little doubt remained on my mind that the sacs were really the result of some peculiarly directed growth of this zoophyte. To ascertain, therefore, how far the cavity of the sac communicated with the central portion or cœnosarc of the Coryne, a sac was cut transversely, near to its connexion with the supporting stem; and a gentle pressure being applied, the nutrient matter of the Coryne escaped from the wound, just as would be seen if a stem was so cut. Transparent specimens were next examined, and the result left no doubt of the sacs being part and parcel of the Coryne. All question upon the matter was, however, completely set at rest by my finding that these sacs had been already noticed by Prof. Allman, who, in a communication made to the British Association in 1859, arrived at a precisely similar conclusion with respect to their zoophytic origin. The abstract of his paper, being very short, may be here quoted entire:—

"*On a remarkable form of Parasitism among the Pycnogonidæ.*"

By Professor Allman, M.D., F.R.S.

"The author described the occurrence, on the branches of some species

of *Coryne*, of peculiar pyriform vesicles, which might at first sight be easily taken for the reproductive sacs of the Zoophyte. They had their cavity in free communication with the general cœnosarcal cavity of the Zoophyte; and an endoderm, ectoderm, and external chitinous investment were easily demonstrable in their walls. The nature of their contents, however, at once distinguished them from the proper reproductive sacs of the *Coryne;* for in every instance they enclosed a Pycnogonidan (*Ammothea*?) The enclosed Pycnogonidan was always solitary, and in smaller vesicles was still embryonic; while in the larger ones, it presented an advanced stage of development, and was ready to escape from its confinement by the rupture of the surrounding walls."

Now come the questions:—How is the sac formed, and how does the young Pycnogon get into the sac? These problems, are more difficult to solve than would at first appear; yet it may I think, be proved that at any rate the sacs are merely modified growths of the Zoophyte.

If figs. 6, 7, 8, & 9, Pl. VI. are examined, it will be seen that the sacs present a strong likeness to " stunted branches" of the polypary, as if a shoot had been suddenly brought to an abrupt termination by an enlargement consequent upon its occupation by a young Pycnogon. This view of the case becomes more evident if we examine the annulated character of the sac, which will be found to agree closely with the same parts seen in the polype, which are similarly annulated. It would therefore appear as if the young Pycnogon occupied the place of the ordinary polype in the Coryne. The sacs are usually found on the lower portions of the stems branching out from the sides, as shown in fig. 6, though occasionally they were met with much higher up. The only manner in which I can account for their position on the lower portions of the stems is this: the young Pycnogons, judging from their growth and the circumstances under which they are found, must have gained access to their tenements at an early period of the year, when the Coryne was but small; and the higher branches would seem to be growths, subsequent to the period at which larval forms abound, which have risen above the level of the parasitically infested shoots.

I possess a female *Phoxichilidium*, taken during the present year, at Lerwick, by the Rev. A. M. Norman, which has several

germs, or ova, seated on the false feet: from an examination of this specimen, I was so fortunate as to obtain a clear insight into some of the very early stages of the ova, which, so far as I can judge, throw much light upon the subsequent stages.

Each sac, or germ, contains a large number of minute ova, which are attached to the investing membrane by four filamentous appendages. These ova, in early stages, are globular (see fig. 1), and appear to consist of a number of granules enclosed in a transparent envelope, from whence proceed the filaments just alluded to. As these granules increase in size, they undergo a sort of segmentation, and put out six rounded lobes, four being at the precise spots from which the filaments are produced, while the remaining pair are larger, appearing between the two pairs, and rapidly increase into two prominent processes, which soon assume the form of foot-jaws (see figs. 2 and 3), and are each provided with a pair of "nippers." The first four warts, two and two, continue their growth, increasing in length very considerably, and ultimately produce four legs, which, though unjointed, are capable of considerable movement. From the tips of these legs the long filaments are seen to proceed; and these have also considerably increased in dimensions, especially at their junction with the legs. Meanwhile the foot-jaws have also considerably enlarged, and, by their outward growth, have given place to another lobe, or wart, between them, which shortly assumes the form of a rostrum. And now we see a little Pycnogon (fig. 4), with only four legs, it is true, but those members are of surprising length, and serve the purpose, I apprehend, of attaching the several larvæ to each other, and to the sac containing them.

Having, therefore, seen the form, and apparent principle, and development, of the ova, from a mere mass of granules up to a period not far from that at which they would burst their bonds and enter upon a different life, we now come to the most difficult question—How does the young Pycnogon gain access to the Coryne? For the actual indisputable answer to this I am afraid we must patiently wait; at present, we can but surmise and guess at the process. I may perhaps be allowed to record my

opinion; right or wrong, future results must settle. We have seen that the young Pycnogon, at the most mature stage at which I have observed it attached to the female, possesses a rostrum, a well-developed pair of foot-jaws (being in fact the most perfectly organized portion of the animal at this stage), and four rudimentary legs, terminated by very long filaments, which attach the young animal in an indirect way to the female. From the appearance of the outer membrane investing the little animal, and the rudimentary character of the legs, I expect a moult would shortly take place, and the animal would then entirely free itself from the investing skin, and legs, with their attached filaments, being then of a globular form, with a pair of foot-jaws, and a short rostrum. At this stage of the development the little animals become free, and here we lose all trace of them as connected with the adult Pycnogon; we should naturally expect that there was little chance of ever again falling in with them in their young state, in consequence of their minute size at this period ($\frac{1}{300}$ to $\frac{1}{400}$ inch across); and doubtless many observers have lost them at this stage. I imagine they are carried by the waves into pools, similar to that before alluded to, and containing a quantity of Coryne. The young animal would naturally cling to any fixed support, and, it may be, progress in some peculiar manner, and thus reach the polypes, or else the tentacles reach it, and shortly afterwards it is conveyed to the oral orifice of the Zoophyte, and being engulphed, is again lost to us, as, once in the Coryne, it becomes the food of that animal, which, we cannot doubt, possesses some means of digesting, and assimilating, such particles of matter, vegetable or animal, as may serve as nutriment. The young Pycnogon, having been received into the cœnosarc of the Zoophyte, would naturally undergo the process of digestion and consequent dissolution; but, in this particular case, we find the ordinary rule does not hold; for the young Pycnogon is found whole, and undergoing development, within the polypary: if it has passed in by the oral orifice, it has by some peculiar means escaped the common fate of most small animals that the polype gets hold of; and if it did not pass in by this aperture, how did it get in? I can see

no other means of entrance; and when we remember that, in many cases, peculiar forms of animal life are found in the intestines, and other parts of various animals of higher grades than those at present under consideration, to which they could only have gained access by the mouth of the animal they infest, and must therefore have been subjected to the process of digestion in their passage to those parts where they are found, it does not appear so very extraordinary that a parallel case exists amongst low forms of marine life. There is no other view of the case that I can conceive at all tenable. The polypary, from consisting of a strong horny envelope, would utterly defy the attacks of a puny animal like that under consideration, assuming for the sake of argument, that the young animal desired admittance through the polypary, and endeavoured in its humble way, to gain an entrance by means of its foot-jaws: such a view will, I think, be admitted to be utterly unlikely. So far then as I can see, in the absence of a better, we must at present content ourselves with the opinion before expressed.

The young Pycnogon being now within the Coryne, we will endeavour to trace the future stages. The little animal, once within the cœnosarc, doubtless makes the most of its foot-jaws, and commences a search for a suitable "locale." To the instinct or other directing agency by which it is guided in this search, I am not prepared to allude; it is sufficient if we take it for granted that it does move freely along the tube of the polypary; whether by accident or instinct, it matters not. A glance into the circumstances of the growth of the Coryne may assist us in understanding the fact of the Pycnogon being found in a sac, without doubt produced by this Zoophyte.

The Coryne, at the time the larval forms may be expected to gain an entrance, from being of humble growth, as before mentioned, would not possess many polypes; numbers would, however, be in course of production. So far as I know, the growth of these polypes results from a branch springing from a stem, at first short and rounded at the free end; the rounded portion, however, changes its character from a thin investing membrane (or membranes) into a "fleshy head" or polype, at first rudi-

mentary, but capable of producing its several parts. During the period that these short rounded branches exist, and before they have begun to assume the polype-character, a young Pycnogon enters one of them, having made a journey from the polype by which it entered, along the cœnosarcal tube of the Coryne; arrived at the end, there it remains to mature, and, by a wonderful provision, the development of the terminal portion of the polypary into a polype is stayed (Pl. VI., figs. 7, 8), doubtless by the young Pycnogon availing itself of the nutrient matter circulating within the cœnosarc as food, and thus withdrawing the material that should have developed a polype. The outer envelope or portion of the polypary (at this particular part) gradually enlarges, so as to assume the form and appearance before described, and the Pycnogon being comfortably housed amidst an abundant supply of food, nothing but time is requisite to enable it to undergo the necessary development.

With such an abundant supply of food as must necessarily be presented to the young parasite within the Coryne, its growth must be rapid. At Pl. VI., fig. 10, I have represented one of the animals extracted from the sac. At this stage its size is much greater than the minute form before described: it now measures $\frac{1}{56}$ inch across. An inspection of the figure will convey a pretty accurate idea of the appearance of the animal. It will be seen that the foot-jaws still retain their advanced state of development, as compared with the other portions, and the rostrum is still short and rudimentary. The foot-jaws were very active, opening and shutting in a highly excited manner, which was, perhaps, not to be wondered at, when we consider the unceremonious way, in which it was again introduced into the world. Within the rostrum, near its base, a peculiar pulsating movement is seen; further than this, no motion is discernible.

The larva must have moulted, and got rid of the four rudimentary legs, and their filamentous appendages; *for we here see, that the young Pycnogon is destitute of legs (not a trace remains), and that the previously described process of the production of these organs by the gradual formation of lobes, to be subsequently elongated into legs, is again seen:* there are now seven such lobes,

three at each side, and one opposite the rostrum, the latter showing a faint indication of division. The eyes, near the base of the rostrum, are also in course of formation; but at this period they are merely seen as a patch of colour.

Passing onward to a further growth, we come to that stage when the young Pycnogon is found in the sac, with the legs doubled up, as shown at Pl. VII., fig. 14. The several organs have now attained a considerable degree of development, and bear a close resemblance to the mature form. Fig. 15 represents the last joints of a leg, with the strong bristles in course of formation. At this stage there is an indication of the young Pycnogon being within a supplementary skin, external to the true skin: this appearance is best seen in the last joints of the legs. The growth of the terminal claw seems a work of time, the deposition of hard material being irregular and unequal.

Having traced, with some slight interruptions, the germs to the larvæ, the larvæ to the immature and parasitical young, we now come to the concluding stages, viz., that period at which the young animal, well developed, and furnished with the necessary organs to enable it to provide for itself, seeks an exit from the Coryne-sac or vesicle: here the foot-jaws doubtless play a most important part.

Such sacs as contain well-developed animals are found to be deeply tinged with colour near the summit: if these are selected and kept in clean and cool sea-water, the whole process may be watched. The animal evidently uses its foot-jaws to rupture the investing skin of the sac, which at this stage, from some peculiar circumstance, seems more limp and pliable than at other times. An opening having been effected, one or both of the claws of the first feet are projected through the opening, and, with the usual slow and languid movements of the class, are worked about, doubtless widening the breach; then another leg appears, and another, until the whole animal emerges and sprawls away. If we examine the figure of the free animal as seen shortly after its escape from the sac, it will be noticed that, although closely resembling the mature form in those features that guide us in the discrimination of the species, it nevertheless requires further

development. It still has only six legs, the fourth pair being represented by short rounded lobes; these lobes, gradually growing, become jointed, and are furnished with claws and bristles; after which, the animal merely requires time to mature its several parts. Whether this is gradual, or assisted by a further moult, I am not prepared to state: it has been seen to perform this process in early life; so it is not improbable that it may do the same, in a more advanced stage.*

Finally, I figure a male *Phoxichilidium coccineum*, and also a portion of a female, both fully matured; so that the several stages, from the germs, devoid of organs of any kind, to the perfect animal, may be compared, and their several points of difference and gradual growth be fully understood.

Setting aside for a short space all that has been written on the subject of the anatomy of these animals as bearing upon their true position, especially by Quatrefages,† I think, if anything were wanting to show their connexion with the Crustacea, the mere phases in their development would be sufficient to decide the matter, and convince those who wish to remove them from this class of their error.

The teachings of development must ever exercise a powerful voice in classification; and when we see so many instances, of the degradation of some animals and elevation of others, in consequence of the increase of our knowledge in this direction, we must all allow that, until we are fully conversant with the life-history of an animal, no matter how profound our other acquaintance with it may be, we have still much to learn. Nearly every animal that we can name possesses some wonderful story which requires unfolding as to its early life; and as our knowledge in this direction is extended, we trace step by step the connexion

* Since writing the above, I have been so fortunate as to discover the moulted skin of the young *Phoxichilidium* which is cast by the animal before or at the time of leaving the sac of the Coryne: this cast-off membrane is extremely delicate and transparent, and shows the several limbs, &c., from which the animal had withdrawn itself, apparently without much damage to the exuviæ. It therefore seems highly probable that the increase of growth in these animals is effected in a similar manner to that of other Crustacea, viz., by a series of moultings. We have seen two instances of this during the embryonic stages, and there is no reason why the process should not continue in after-life.

† See Quatrefages in 'Annales des Sciences Naturelles.'

of one form with another, and prove that forms now regarded by zoologists as fully matured, and therefore described as so many distinct species, are but the varied phases assumed by some one animal during the singular stages of its development. Hence the value of the study of development—that great law of life, everywhere seen and everywhere at work, silent but sure, teeming with beauty, and elevating all who rightly ponder and study the manifold mercies and wisdom of the great Creator who has made so many and such varied forms of life—varied in form, varied in habit, and varied in usefulness, but all showing a marvellous beauty of design, and adaptation of form, and habits, to the several circumstances of their lives. In conclusion I have to express my thanks to my esteemed friend the Rev. A. M. Norman for the valuable advice and assistance he has so kindly afforded me during my investigations, and in the preparation of this paper.

EXPLANATION OF PLATES VI. AND VII.

Fig. 1. Early appearance of larva of *Phoxichilidium coccineum*, removed from ovum attached to female.

Fig. 2 & 3. Further stages, showing the early appearances of foot-jaws and rudimentary legs.

Fig. 4. Well-developed larval stage, with foot jaws, rudimentary legs, and their filamentous appendages.

Fig. 5. The same, more highly magnified, and showing more distinctly the several parts.

Fig. 6. Branch of *Coryne eximia*, with sacs of various forms, and in several of the positions they occupy upon the polypary.

Fig. 7. Branch of *C. eximia*, with a sac at the extremity of the stem, and a young polype in course of formation at the extremity of another stem.

Fig. 8. Branch of *C. eximia*, with a sac at the extremity of a stem, which by its position appears to have withdrawn the nutriment from an adjoining part, staying the growth of a shoot, which is seen as a short rounded lobe.

Fig. 9. Branch of *C. eximia* , with a sac at the extremity of a stem.

Fig. 10. Early form of parasitical young at that period of its existence after it had moulted for the first time and rid itself of the rudimentary legs and their appendages, *being now entirely destitute of legs.*

Fig. 11. Further stage, or that period at which it is found free, having effected its escape from the sac.

Figs. 12 & 13. Portions of females, mature and immature, showing the form and growth of the false feet or "egg-carriers."

Fig. 14. Parasitical young in an advanced stage, and as found doubled up in the sac.

Figs. 15, 16, & 17. Various stages in the development of the claws: viz. 15, whilst within the sac; 16, shortly after escape; and 17, when mature.

Fig. 18. Mature male *Phoxichilidium coccineum.*

XXV.—*Notes on the Botany of the South Durham Ballast Hills in the Year* 1861.—By the Rev. Alfred Merle Norman, M.A.

Having paid several visits during the past summer to the Ballast Hills at Hartlepool, Seaham, and Port Clarence, for the purpose of ascertaining the introduced plants which grow upon them. I beg to offer to my brother botanists the following notes on the rarer species which came under my notice.

The Hartlepool Ballast Hills are very extensive and their flora highly interesting. The ballast unshipped in the harbour of the old town, has been deposited to the north, among the sandhills, and now forms a barrier, perhaps two miles long, which runs parallel with the sea margin, and is of considerable service in preventing the loose and shifting sand from being blown over those fields, which are in the proximity of the sea. The West Hartlepool deposits lie to the south of that town, and are just inside the railway. Street after street of this rapidly increasing seaport is built towards the same direction, and land on which a short time since rubble was deposited, is now covered with a teeming population. In a few years more the habitat of many of the plants referred to in this paper will be probably thus destroyed, even should the species be sufficient hardy to survive the struggle attendant upon a change of climate and of soil.

Papaver hybridum, L.—A plant or two at West Hartlepool on the southern extremity of the deposits. *P. Argemone*, *dubium*, and *rhœas* are all common. I have not yet

succeeded in detecting in the county that variety of *P. dubium* known as the segregate species, *P. Lecoquii* (Lamotte,) and which is distinguished by its stronger growth, more divided leaves, slightly different capsule, and *yellow* sap.

Glaucium luteum, Scop.—Old Hartlepool, scarce.

Fumaria micrantha, Lag.—Rare; West Hartlepool.

Coronopus didyma, Sm.—A single plant only observed at West Hartlepool.

Coronopus Ruellii, Gaert.—Common.

Thlapsi arvense, L.—West Hartlepool, scarce.

Lepidium ruderale, L.—Port Clarence, West Hartlepool, and Seaham.

Nasturtium sylvestre, Br.—Common, West Hartlepool.

Nasturtium terrestre, Br.—Old and West Hartlepool.

Nasturtium amphibium, Br.—A few plants on the more recent deposits at West Hartlepool.

Sisymbrium Sophia, L.—Common and well established on the older part of the hills at Port Clarence and West Hartlepool.

Sinapis muralis, Br. and *S tenuifolia*, Br. are among the most abundant plants of the Ballast Hills.

Sinapis Schkuhriana, Reich.—I found a Sinapis growing on the oldest part of the West Hartlepool Ballast Hill, which I was unable to determine. Mr. J. G. Baker to whom I referred it, believes it to be the above named species. From its habitat, it has probably been established at Hartlepool for some years.

Raphanus rhaphanistrum, L.—Frequent.

Reseda fruticulosa, L.—Two or three plants at West Hartlepool. *R. luteola* and *lutea* are among the most abundant and characteristic plants of the deposits.

Saponaria officinalis, L.—Abundant and fine at the extremity of the Old Hartlepool Hills.

Spergularia rubra, St. Hil.—West Hartlepool, not common. The other species of the genus observed were *S. marina* (Lamb), and *S. neglecta* (Kind).

Arenaria serpyllifolia, L.—This well known plant has been recently split up into three so called "segregate species." *A. serpyllifolia* (L), *A. leptoclados* (Gussone), and *A. Lloydii* (Jordan). *A. leptoclados* is a plant with smaller capsules, smaller and thinner leaves, more slender stems and diffuse habit than the segregate *serpyllifolia*, and is the common form in this district. *A. Lloydii* on the other hand is of robuster growth, larger in all its parts, with "viscid stems and calyces, the latter strongly and irregularly nerved." It was first distinguished in our islands by Mr. A. G. More, who gathered it two years since on the coast sandhills at St. Helen's in the Isle of Wight. This summer I found it at West Hartlepool. *A. serpyllifolia*, the intermediate form, is apparently scarce in South Durham, I have only noticed it in one locality near Sedgefield.

Medicago sativa, L.—Common, Old and West Hartlepool.

Medicago minima, Lam.—Two or three square yards of the West Hartlepool Ballast Hills were completely covered with a profuse growth of thousands of this little southern plant. Many of the specimens were as fine as any that I have gathered in Jersey.

Melilotus vulgaris, Willd.—This species and the more common *officinalis* (Willd), are among the more abundant, and characteristic plants of the hills.

Trifolium repens, L.—A viviparous form of the Dutch clover, in which the place of petals is supplied by little leaves, covers many square yards of ground at Seaham.

Trifolium arvense, L.—Frequent in all the localities referred to in this paper.

Trifolium scabrum, L.—Confined to one spot at West Hartlepool, but there abundant.

Onobrychis sativa, Lam.—Widely scattered over the Old Hartlepool deposits.

Scleranthus annuus, L.—The two Hartlepools.

Petroselinum sativum, Hoffm.—West Hartlepool, not common.

Oenanthe crocata, L.—Two or three plants, West Hartlepool.

Fœniculum vulgare, Gœrtn.—Not uncommon; Port Clarence, Old and West Hartlepool.

Pastinaca sativa, L.—Extremely abundant.

Dipsacus sylvestris, D.—A few plants, Old and West Hartlepool.

Helmintha echioides, Gœrtn.—West Hartlepool. I may mention that I have also found this plant in the hedges by the road side between Billingham and Cowpen, and in a similar situation about a mile and a half from Bishopton on the road to Sedgefield.

Cichorium Intybus, L.—Scarce, West Hartlepool.

Carduus tenuiflorus, Curt.—Not uncommon on the Ballast Hills, but also a true native of our coast.

Centaurea cyanus, L.—West and Old Hartlepool.

Centaurea calcitrapa, L.—This interesting species grows luxuriantly on the West Hartlepool Ballast Hills. There are several fine plants which rival those of the South of England, or the Channel Isles.

Artemisia campestris, T.—A single example, but that a very fine plant, growing at the southern extremity of the West Hartlepool deposit. The three more common species of the genus likewise occur.

Erigeron Canadensis, L.—Abundant a mile and a half along the Old Hartlepool hills, and a few plants observed at West Hartlepool.

Senecio sylvaticus, L.—West Hartlepool, scarce.

Senecio viscosus, L.—Sunderland, Seaham, Old and West Hartlepool. Most abundant in the last locality.

Solanum migrum, S.—Old and West Hartlepool, frequent.

Linaria vulgaris, Mill.—Port Clarence.

Echium vulgare, L.—West Hartlepool, &c.

Myosotis versicolor, Lehm.—Scarce, West Hartlepool.

Chenopodium rubrum, L.— Seaham and West Hartlepool, scarce.

Chenopodium glaucum, L.—Old and West Hartlepool.

Atriplex arenaria, Wood.—Old Hartlepool, scarce.

A. Babingtonii, Wood.—Abundant.

A. littoralis, L.—Extremely abundant.

Beta maritima (L), *Salsola Kali*, (L), and *Schoberia maritima*, (Mey), are to be noticed here and there.

Polygonum rurivagum,* Jordan.—Old Hartlepool.

Polygonum microspermum, Jordan.—Stockton and Seaham.

Polygonum aviculare, L.—Everywhere.

Polygonum arenastrum, Jordan.—Seaham.

Rumex maritimus, L.—On the West Hartlepool Ballast Heaps; abundant.

Mercurialis annua, L.—Old and West Hartlepool; frequent.

Apera spica-venti, Beauv.—Two or three luxuriant plants, near the extremity of the West Hartlepool deposits.

Glyceria rigida, Sm.—Frequent on the Ballast Hills as well as in many other less suspicious localities in this county.

Glyceria loliacea, Sm.—A single plant. West Hartlepool.

Hordeum maritimum, With.—On the made ground at West Hartlepool; and also found in many places on the sea-wall between Port Clarence and Greatham.

Lepturus filiformis, Frin.—West Hartlepool Ballast Hills; scarce.

Many of the plants in the preceding list have not previously been observed, I believe, in the Tyne province, even as introduced species.

SEDGEFIELD, JANUARY 6, 1861.

XXVI.—*Notes on the Species into which the Linnæan* Polygonum aviculare *has been divided by Continental Botanists.* By the Rev. ALFRED MERLE NORMAN, M.A.

UNDER the name of *Polygonum aviculare*, British botanists have up to the present time included a greater number of forms, than perhaps remain in these days of "Segregate species," under any other title among our Phanerogamia. It is far otherwise on the Continent, where the Linnean *aviculare* has been sub-divided into

* For description and remarks on this, and the three following species, see the next paper.

several species. In 1860 I gathered several Polygona in this county, which struck me on account of the great diversity of character which they exhibited. Thinking it not improbable that they had been separated into species by the French botanists, I forwarded specimens to Mr. J. G. Baker. Mr. Baker also considering these forms very interesting, was kind enough to enclose them in a parcel he was dispatching to the learned French botanist, M. Boreau. M. Boreau identified them as *Polygonum microspermum* (Jordan), *Polygonum rurivagum* (Jordan), *Polygonum arenastrum* (Jordan), and a fourth form taken by Mr. Baker in Yorkshire, he referred with doubt to *Polygonum agrestinum* (Jordan). Before proceeding to give a rough sketch of these plants, I must say a word on the reason why I draw attention to them. I would wish it to be understood that I do not put them forward as necessarily *species*, but as forms highly interesting, well worth studying, and at any rate possessing claims to specific distinction, fully equal to those on which many so called species are inserted in our modern Flora. These plants having been received and named as species on the continent, it is, I conceive, at least the duty of the British botanist to endeavour to discover if there are these and such like plants growing in our island, and if they find them, then to proceed to investigate the validity of the claim which has been advanced in their behalf by our neighbours, who would raise them to a higher position in systematic arrangements, than they have hitherto held in our estimation. We have no right to pronounce decided opinions upon "Segregate species," or to declare them to be "mere varieties," unless we have familiarized ourselves previously with the plants in question, and carefully and honestly weighed the opinion which we may be ourselves disposed to adopt. Not having the descriptions of M. Boreau, or M. Jordan at hand, I merely give the following rough notes on the several forms as observed by myself in this county.

Polygonum rurivagum, Jordan. — Stem solid, very slender, flexuous, generally erect. Leaves linear-lanceolate, an inch or more long, length to breadth as 10 to 1. Stipules much lacerated, being ultimately split up into thread like segments, pale, scarious,

very long (fully half an inch to lower leaves), over-topping the flowers. Flowers sessile or nearly so, generally one only in each axil. Height 1 to 1½ feet.

A graceful form, remarkable for its slender growth, long narrow leaves, and long and much cut stipules, which on the buds are entire, white, and glistening, but ultimately become very much lacerated. Gathered in corn-fields in the neighbourhood of Sedgefield, and on the Old Hartlepool ballast hills.

Polygonum microspermum, Jordan.—Stems solid, hard, wiry, generally prostrate. Leaves lanceolate, seldom exceeding half an inch long, length to breadth as 5 or 6 to 1. Stipules lacerated (but not divided into such narrow segments as in the last plant), shorter than the flowers. Flowers shortly peduncled, one or two in each axil. Stems not exceeding six inches.

A little prostrate, wiry-stemmed plant growing on barren ground, distinguished from *aviculare*, its nearest ally, by its smaller size and seeds; its more lacerated stipules and linear leaves, which last, moreover, are generally appressed to the stems. On the quay and in the timber yards at Stockton, and on the ballast heaps at Seaham. (A. M. N.); Isle of Wight. (Mr. A. G. More).

Polygonum aviculare, L.—Stems solid, straggling, upright or prostrate. Leaves long-ovate, half an inch to one inch long, length to breadth as about 4 to 1. Stipules but little torn, dark, much shorter than the flowers. Flowers peduncled, two or three in each axil. Height one to two feet. Waste and cultivated land, abundant everywhere.

Polygonum agrestinum, Jordan. — Stems stout, hollow, upright, strongly striated. Leaves ovate; often nearly two inches long, length to breadth as 2-3 to 1. Stipules lacerated, much shorter than the flowers. Flowers richly coloured, mostly 3 (2-4) in each axil, with peduncles equal to the length of half the flower. Height 2-3 feet.

Known by its large size, broad, ovate leaves, and hollow stem. This is the most showy of the forms; and has been gathered in a corn-field at Shincliffe, (A. M. N.); and in the neighbourhood of Thirsk.—(Mr. J. G. Baker.)

Polygonum arenastrum, Jordan. — Stems solid, upright, strong, crowded, nearly smooth in the internodes. Leaves long-ovate, seldom exceeding half an inch long, length to breadth about 4 to 1. Stipules much lacerated, as in *rurivagum*, but dark coloured and shorter than the flowers. Flowers pale, 2-4 in each axil, nearly sessile. Height about six inches.

Totally different in habit from the other forms. A little bush, with stout and crowded erect stems, the leaves and flowers crowded and imbricated, both withering and falling off soon after flowering, so that the base of the stems are usually bare (more especially if the plant be growing in sand) save that a circle of much divided brown stipules surrounds each of the closely-set joints.

A *Polygonum* which I gathered on the West Hartlepool ballast hills in 1860, was referred, but with doubt, to *arenastrum* by M. Boreau. The plant above described, and which is probably the typical *arenastrum*, I have found this year abundantly about Seaham.*

XXVII.—*On species of Ostracoda, found in Northumberland and Durham, new to Great Britain.* By the Rev. Alfred Merle Norman, M.A.

It is strange that so few British Naturalists should have up to the present time studied the Entomostraca. Surely this can only be the case because they are ignorant of the extremely interesting field of search which lies open to them, and the marvellous diversity in Morphological and Physiological characters which this lower division of the Crustacea exhibits. This is not the place to give details on the subject; but in the hope of inciting others to enquiry I cannot help briefly alluding to some of the anomalies and other points of especial interest which are presented to us in the history of the three orders, *Cladocera*, *Ostracoda*, and *Copepoda*. Those who would follow up the hints here given are referred to Dr. Baird's "*History of British Entomos-*

* A set of these plants has been presented to the Natural History Society of Newcastle-on-Tyne, at whose Museum they can be referred to by members of the club.

traca," issued by the Ray Society, and to the many valuable memoirs, which since the publication of that work have been added to the literature of the subject by Continental Naturalists; among these I would especially direct attention to the valuable monograph recently published by Dr. Leydig, "*Naturgeschichte der Daphniden*."

The variations of external form among the Entomostraca, and especially in the parasitic *Copepoda*, are so great, and the functions which the different organs frequently assume are so curious and abnormal, that the elucidation of the identity of homological parts becomes a matter of no little difficulty, and of proportionably increased interest. In the functions attendant upon the act of generation we find the most remarkable phenomena; thus among the *Cladocera* we have some of the best established instances of true Parthenogenesis, and also a twofold mode of reproduction, the one by the ordinary eggs, the other by the ephippical or winter eggs; among the free *Copepoda* the act of impregnation is in many genera effected by the attachment of the strange "sperm tubes" to the body of the female, while among the parasitic tribe of *Lernæoidea* the males are so minute in proportion to the females, and altogether so different in aspect that it has been a matter of dispute whether they were not larval forms. These extraordinary males, moreover, live attached to the female through life, or at any rate they have always hitherto been met with clinging to some portion of the body of the gentler sex. Then again there is in this sub-class a remarkable tenacity of life by which the eggs are enabled to survive the most intense cold of winter when completely frozen in blocks of solid ice, and also the drought of summer when the ponds, which they inhabit, are completely dried up. The peculiar transparency of a large number of the species offers to the physiologist the most unusual facilities for the study of the minute structure of the several systems which discharge the functions of nutrition, circulation, reproduction, and sensation. Lastly, the peculiarities observable in the metamorphosis, habits and economy of the Entomostraca, their wonderful productiveness, and the part which from their extraordinary members they perform in cleansing water,

in supplying food to the vast shoals of herrings and other gregarious fishes, and in aiding to produce the phosphorescence of the sea, all contribute to place the history of these minute Crustacea among the most interesting of scientific investigations.

The number of species included among the Entomostraca is certainly not large, but there cannot be a doubt a great many additional forms would be found in our island if they were properly looked after. During the past year the researches of myself and of those friends who are kindly assisting me in preparing material for a catalogue of the Crustacea of our district have been rewarded by the discovery of several species new to our Fauna. Those from among them which belong to the family *Cypridæ*, I am now about to describe.

Fam. **Cypridæ.**

Subfam. I. Cyprinæ, Dana.

Genus Cypris, Müller.

1. *Cypris punctillata, n. sp. (Pl. III. figs. 11-14.)

Forma subovalis; altitudo maxima ante medium sita; margo dorsalis valde arcuatus, ventralis in medio incurvatus. *Forma desuper spectata* ovato, in medio latissima, extremitates versus eodem modo parum attenuata. *Latitudo altitudoque* fere æquales. *Basis* lata, ad extremitates convexa, trans medium impressa atque concava. *Valvarum superficies* undique pilis obsita, cellulisque rotundatis numerosissimis excavata, antice et postice aculeis fimbriata. *Margo valvarum interior* antice et postice latus, lamellosus; lamella sulco profundo excavata. *Color* saturate viridis. Long. $\frac{7}{80}$ unc.; alt. $\frac{4}{80}$ unc.

Habitat stagna limpida prope Sedgefield in regione Dunelmensi.

Carapace subobovate; dorsal margin boldly arched; ventral margin incurved centrally; the highest part of the valves situated a little before the middle. Surface everywhere clothed with long hairs, and sculptured with closely arranged roundish

* These descriptions are published also among my "Contributions to British Carcinology." in the Annals of Natural History for the present month.—January, 1862.

cells. The superior portion of the anterior extremity is margined with a row of eight spines; and the inferior portion of the posterior extremity in the right valve is margined with about five spines. The lowest of these posterior spines is considerably larger than the others, and in size and appearance corresponds with a similarly situated tooth in *Cyprideis torosa*, and with that present in the left valve of *Notodramas monacha* (*Cypris monacha*, Baird.) Possibly these teeth serve as guides to the right adjustments of the valves, and prevent the margin of the one from overlapping the margin of the other too far when closed.

The form of the carapace, when viewed from above, is ovate; and the valves (which are so tumid that the diameter and height are nearly equal) have their greatest convexity in the centre. The base, or ventral surface, is broad, rounded towards the extremities, but in the centre hollowed out and flattened, giving the carapace a pinched-in appearance at that part. The front and hinder margins are produced internally into broad plates, these plates being channelled by a deep groove.

Colour deep green. Length $\frac{7}{80}$ inch; height $\frac{4}{80}$ inch.

This fine species may perhaps be most readily known by the peculiar pinched-in and flattened surface of the centre of the ventral margin; and this character is evident in all stages of growth. The young, as is usually the case among the *Ostracoda*, have the posterior extremity very much narrower in proportion to the anterior than is the case in more fully developed individuals. The only British *Cypris* which equals the present species in size is *C. clavata* (Baird.)

I first found *Cypris punctillata* in the autumn of 1860, in the parish of Sedgefield, in a piece of clear water known as the Forge Dam. It was there associated with *Alona quadrangularis; Peracantha truncata; Pleuroxus trigonellus; Cypris compressa*, *minuta*, *Westwoodii*, and *bistrigata* (Jurine); *Candona lucens* and *serrata* (Norman); *Cyprideis torosa*, and other more common Entomostraca. During the past summer, I have met with it in extreme abundance in a second habitat—a pond at Layton, about two miles distant from the first locality, where it lies in company with *Daphnia Schæfferi* and other species.

2. Cypris aculeata, Liljeborg. (Pl. III. figs. 7-10.)

Cypris aculeata, Liljeborg, om de inom Skane förkom. Crust. af Ord. Cladocera, Ostracoda och Copepoda, p. 117. tab. XI. figs. 15-16.

Forma brevis et alta, reniformis; margo dorsalis valde arcuatus ad apicem rotundatum fere in medio situm assurgens; margo ventralis leviter sinuatus. *Forma desuper spectata* elongato-ovata, antice angustior, acuminata. *Latitudo* maxima altitudine multo minor, pone medium sita. *Basis* convexa. *Valvarum superficies* aculeis arcuatis pilisque intermixtis admodum hispida, cellulis numerosissimis excavata. *Color* cæruleo-viridis. Long. $\frac{2}{80}$ unc.

Habitat regionem Dunelmensem prope Sunderland et Stockton.

Carapace reniform, very high in proportion to its length, covered all over with very numerous cells, and clothed with a hispid covering of intermixed hairs and arched spines. The spines are most evident near the dorsal margin, but there are none fringing the anterior and posterior margins (the only position which spines occupy in the last described species.) The dorsal margin is greatly arched, rising to a rounded summit, which is situated nearly in the centre of a valve; ventral margin slightly incurved centrally.

The form of the carapace, viewed from above, is elongated ovate, slightly narrower in front than behind, and in no part more than slightly convex, so that the height greatly exceeds the diameter. The inferior antennæ have four long and two short slightly plumose filaments. The base is convex.

Colour dark blue-green. Length $\frac{2}{80}$ inch.

Cypris aculeata, now first added to the British Fauna, has been well described and figured by Liljeborg. I received the species in the early part of the summer, from Mr. G. S. Brady, the friend to whom I am moreover indebted for his most kind assistance in illustrating this paper.

Mr. Brady found it in a pond connected with the pumping engine of the Monkwearmouth Colliery, near Sunderland. The

water in this pond is of variable temperature, but generally sufficiently hot to steam copiously. At the time the species was taken the water was found to be "over 100° Fahr." This high temperature seemed favourable to the development of Entomostraca; and the luxury of a warm bath was shared by *C. aculeata*, with *C. strigata?* and *vidua*, *Candona reptans*, *Cyclops quadricornis*, and *Daphnia vetula*. Mr. Brady has since taken the species in Hylton Dene, and remarks that the "specimens from this locality showed the same lively habits, and in the same manner kept generally near the surface, as those from the hot water reservoir. It seems, he adds, quite a gregarious species, and swarms upon any little vegetable tuft it may find in a bottle, seeming to avoid the soil as much as possible. It is by far the most active species of the genus that I have seen." It has been found during the autumn in a third locality by myself, namely, in Cowpen Marshes, near Stockton-on-Tees.

Genus Candona, *Baird.*

3. Candona serrata, n. sp. (Pl. III. figs. 1-6.)

Forma elongata, aliquantum cuneiformis; margo dorsalis antice valde elevatus, inde ad extremitatem posteriorem descendens; ventralis subrectus; extremitates rotundatæ; altitudo maxima ante medium sita; ita ut antica pars quam postica multo est altior. *Forma desuper spectata* compressa; antica pars posticæ æqualis; latitudo maxima mediana. *Valvarum superficies* foveolis impressa sparsisque pilis obsita; ad extremitates inferne aculeis brevibus, crassis, externe directis, marginata. *Color* cinereus, macula centrali ovali, atque zona marginali pallidis pictus. Long. $\frac{5}{80}$ unc.; lat. vix $\frac{3}{80}$ unc.

Habitat stagna limpida prope Sedgefield in regione Dunelmensi.

Valves elongated, somewhat cuneiform; dorsal margin greatly raised in front, thence gradually descending to the posterior extremity; ventral margin nearly straight; anterior and posterior margins rounded; point of greatest height situated in front, the hinder portion of the valves being much narrowed. Surface of

valves irregularly marked with slightly impressed grooves, and clothed with scattered hairs; lower portions of the anterior and posterior margins edged with spines, which are short and directed upwards and outwards, and are in number eight to ten in front, and about seven behind. Viewed from above, the carapace is compressed, widest in the middle, and gradually and equally narrower towards the extremities. The height greatly exceeds the breadth. The filaments of the superior antennæ are very long. The ground-colour is an ashy brown painted with a central patch and a marginal zone of a pale buff. Length $\frac{5}{80}$ inch; breadth not quite $\frac{3}{80}$ inch.

Found in extreme abundance among *Zygnema nitidum*, in October, 1860, in the Forge Dam at Sedgefield—the same habitat which, as already mentioned, first gave the *Cypris punctillata*. This year the species is comparatively scarce.

It is not without considerable misgivings that I have placed this species provisionally in the genus *Candona*. It undoubtedly belongs to that genus as first constituted by Dr. Baird, and has close relationship with our common species, *Candona reptans*. Prof. Liljeborg has, however, taken *Candona lucens* as the type of the genus, and having shown that the anatomical features of the former species are inconsistent with those of the latter, has excluded *Candona reptans* from among the *Candonæ*, and inserted it in the genus *Cypris*, of which, together with *Cypris lucida* (Koch) and *Cypris Jurinii* (Zaddach), he has made it a section. This section is characterised by having "the setæ attached to the interior of the third joint of the inferior antennæ short, and not reaching to the apex of the nails of the last joint." According to Liljeborg's arrangement, therefore, the present species would fall into his Section B. of the genus *Cypris*. It is not improbable that further observation may point out the expediency of constituting a new genus to receive these intermediate forms. Notwithstanding the length of the filaments of the superior antennæ, the shortness of those of the inferior antennæ render *Candona serrata* like *Candona reptans*, utterly unable to sustain itself in the water. It is remarkably active, however, on its feet, and runs with great agility.

Subfam. II. Cytherinæ, *Dana*.

Genus Cythere, *Müller*.

4. Cythere contorta, n. sp. (Pl. III. fig. 15.)

Forma elongata, fabæformis; margines dorsalis, anticus et posticus arcuati; margo ventralis ante medium valde incurvatus, post medium subrectus; altitudo maxima pone medium sita. *Forma desuper spectata* compressa, in medio latissima, ad extremitates gradatim æqualiter diminuens. *Latitudo* altitudine multo minor. *Valvarum superficies* lævis, margaritacea, polita, sparse et minute punctata, zona ciliorum prope marginem sita circumdata. *Color* albidus. Long. vix $\frac{3}{80}$ unc.

Habitat mare ad Berwick in regione Northumbriensi.

Elongated bean-shaped; dorsal, posterior, and anterior margins rounded; ventral margin deeply concave before the middle; the highest part of the valves is towards the posterior extremity. The form, as seen from above, is compressed, the breadth gradually and equally diminishing from the centre to the extremities. The greatest diameter is greatly surpassed by the height. The surface of the valves is smooth, polished, and pearly, merely impressed with a few scattered punctures; encircling the valves at a short distance from their margin, runs a fringe of cilia ranged in single file, which forms a marked characteristic in the species. Colour white. Length not quite $\frac{3}{80}$ inch.

Found among shell-sand at Berwick-on-Tweed, Sept. 1857.

EXPLANATION OF PLATE III.

Fig. 1. *Candona serrata* (Norman), left valve, x 20.

Fig. 2. The same seen from below, x 20.

Fig. 3. The same seen from above, x 20.

Fig. 4. The same; fragment of valves to show their structure and the arrangement of the lucid spots, x 100.

Fig. 5. Superior antenna of the same species, x 100.

Fig. 6. Inferior or pediform antenna of the same species, x 100.

Fig. 7. *Cypris aculeata* (Liljeborg), right valve, x 40.

Fig. 8. Dorsal view of the same species, x 40.
Fig. 9. Ventral view of the same species, x 40.
Fig. 10. A fragment of the valves of the same species to show their structure, and the mixed clothing of hairs and spines, x 200.
Fig. 11. *Cypris punctillata* (Norman), left valve, x 20.
Fig. 12. The same species seen from above, x 20.
Fig. 13. The same species seen from below, x 20.
Fig. 14. A fragment of the valves of the same species to show their structure and the clothing of hairs, x 100.
Fig. 15. *Cythere contorta* (Norman), right valve, x 40.

XXVIII.—*Miscellaneous Notices and Observations.*

On the occurrence of Alderia modesta near Sunderland.—About a week ago, while collecting *Entomostraca* in a salt marsh near Hylton, I gathered several specimens of a nudibranchiate mollusc, the species of which I could not determine. Mr. Alder, to whom I forwarded the specimens, pronounces them to belong to *Alderia modesta*, and adds, "I am delighted to find it an inhabitant of our district. It is one of the rarest British species, having been found only in the south of Ireland, and south of Wales, and always in brackish water or salt marshes. I hope you will be able to send us living specimens to examine, and for Mr. Hancock to make drawings from." The Hylton specimens were, when taken, of a dull greyish green colour, but this tint speedily faded on the animals being put into preservative fluid. Dilute spirit discharged the colour less than Goadby's solution.—*George S. Brady, Sunderland, Sep.*, 1861.

Spongilla fluviatilis.—The occurrence of this fresh water sponge in our immediate neighbourhood is, perhaps, worth record. I found it abundantly in a deep pool near the Don, a little to the west of Brockley Whins Station. The stones at the bottom, as well as the stems of rushes, were in many places, completely covered with it. It must, I think, be scarce in our district, as after a deal of fishing in fresh-water, I have not observed it in any other locality.—*Ibid.*

Fresh-water Algæ.—Several interesting species have occurred to me recently, in our neighbourhood. At Ryton *Sphærozyga elastica* (Ag.), *Cylindrospermum spirale*, and *Draparnaldia cruciata* (Hicks,) in a ditch near Crag Lake; *Raphidia viridis*, on stones at the margin of a deep pond near the Brockley Whins Station; *Tetraspora gelatinosa*, in a pond near Charlton, on the North Tyne; *Tolypothrix distorta*, abundantly on Mordon Carrs; *Physactis parvula*, (Kutz), and *Clathrocystis æruginosa*, (Henfrey), in the moat at Raby Castle. The two last named were kindly sent to me by the Rev. A. M. Norman, and for their identification, I am indebted to Professor G. W. Arnott, and Mr. Roger Kennedy of Glasgow. I may add, that, with a view to the preparation of a complete catalogue of the local species, I should feel obliged, if such of our members as are interested in the subject, would communicate to me any interesting specimens which may occur to them.—*Ibid.*

Volvox globator.—This beautiful organism appears to be more generally distributed in our district than we have been used to suppose. For several years the only known locality for it was Prestwick Car, where it was found by Mr. Atthey. In a recent part of the "Transactions," Mr. Norman records its occurrence at Sedgefield; and during the past year it has been noticed in several fresh places. According to newspaper report, it was found abundantly in a pond at Darlington, by some "minute philosophers," attached to a temperance excursion. I detected it at Ryton in September, and also among some algæ brought from Fardingslake near Marsden in October. Lastly, Mr. Norman informs me that he noticed it in the moat at Raby. —*Ibid.*

Botanical Notes.—During the summer I have noticed but few plants of any rarity in this district, viz: *Phalaris Canariensis* growing in a turnip field at Norton, and *Medicago stativa (Lucerne)*, on September 13th, in a stubble near Billingham, the seed of it had doubtless been sown by accident with the corn, as the plant is not cultivated for fodder in this neighbourhood. On the 23rd October I gathered *Fumaria capreolata*, which is rare here, in flower. I never before saw it

in this state, so late in the season, a proof of its mildness. This has been an unusually good autumn for the *Fungi*, I have seldom found the common *mushroom*, so fine or so abundant; during the summer I have noticed many plants of the curious *Phallus impudicus*, which is scarce here. I have also met with a slender variety of *Ervum tetraspermum* with the leaflets, more linear and acute, and less numerous than in the normal form, there being only three pair instead of five, as is usually the case.—*John Hogg, Norton, September* 28, 1861.

Departure of Swallows.—I must record the *early* departure of the swallows from this vicinity. In general most of them depart about the 20th September, but this year the *greater* number had gone by the end of the first week in September. This at first surprised me, as the weather has continued so very fine; but on consideration, I apprehend the true cause to have been the *want* of winged insects, and—most likely owing to the great *dryness* of the summer—fewer *gnats*, which form a chief portion of the food of these birds, than would have been produced in wetter or ordinary years. Many swallows, probably however, only those of the second broods, remained after that period, but they have now also left, having, except a few stragglers, disappeared by the 24th instant.—*Ibid.*

Scarcity of the Corncrake. — The scarcity of the common corncrake in this district has been remarked by me for the last three or four years. During the months of May and June in those years I have scarcely ever heard the well known harsh note of these birds, nor have I during those autumns, whilst shooting, met with any of them.—*Ibid.*

Winter Visitors.—Our last winter's acquisitions in ornithology were very poor, only some wild swans (Hoopers) and a few of the less common *Anatidæ*. This, I concluded, was caused by the intense severity of the frost which induced the birds from the north of Europe, not to remain here, but to proceed on their migration further southwards, until they had arrived in a warmer country where food might be obtained.—*Ibid.*

Occurrence of Tengmalmi's Owl.—A good specimen of this little owl, *Noctua Tengmalmi*, was shot last month, November, near

Cowpen, about three miles N.E. of Norton. I saw it on Wednesday last at Stockton, where it is being stuffed for the person who shot it. It corresponds well with Bewick's figure, (p. 10 "Supplement," Newcastle 1821), which was taken from the specimen shot at Widdrington in Northumberland, in January, 1823.*—*Ibid, December* 13, 1861.

The Norway Lobster and Red Mullet.—Owing to the recent introduction of "*trawling*" in this district, large numbers of the pretty little lobster, *Nephrops Norwegicus* have been caught, and have been sold at the fish shops in the town. It has always been a favourite article of food in Scotland; but in this district it has been unknown in this capacity. Its flesh is more delicate in flavour, and less tough than that of the common lobster, but unfortunately there is less of it. Whether owing to improved methods of fishing, or to its actual numerical increase on this coast, I am not prepared to say, but the *Red Mullet,* has during the past year been seen in our fish shops, much more frequently, and in greater numbers than formerly.—*Henry T. Mennell, January* 3, 1862.

Vitality of the seed of Fumaria muralis (Sonder), *and Hyosyamus niger*, L.—The ancient churchyard of Embleton, in this parish, was surrounded by a very old hedge, which last year, when the church was re-built, was grubbed up. Upon this freshly turned up ground—earth which had not been disturbed for centuries—there sprung up in profusion two interesting plants *Fumaria muralis* (Sonder) and *Hyoscyamus niger* (L). What makes the circumstance the more remarkable is the fact, that this is the first and only instance in which I have met with either of the Capreolate Fumariæ in the neighbourhood, notwithstanding that they have been closely looked for. Such instances of the vitality of seeds are not unfrequent, but are always interest-

* Both Bewick and Selby first referred this bird to the *N. passerina*, (Linn.), the latter author, however, subsequently corrects this opinion, (*Trans. Nat. Hist. Soc., North.*) and shows it to be the *Noctua Tengmalmi* of Temminck which is distinguished from the other British species of little owl, *N. nudipes*, by having the toes, as well as the tarsi, densely feathered. Authors differ as to whether the *N. nudipes* is the *N. passerina* of Linnœus, but if the latter be a third species, it has not occurred in Britain.—*Secs. T. N. F. C. - January* 22, 1862.

ing; and offer some problems well worthy of solution. Why had not these seeds previously germinated? Perhaps because they were too deeply buried in the ground. But if this be so, at what depth do seeds cease to vegetate and what is the influence, which acting on the germ, keeps in abeyance the vital energy stored up within?—*Alfred Merle Norman, Sedgefield, January* 7, 1862.

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Delicacy of the lungs of birds.—A few years ago I observed, five or six birds lying dead at the mouth of a disused Coal Drift, the upper surface of which had partly fallen in. These birds had alighted upon the broken edges of the Drift and been overpowered by Carbonic Acid Gas, which must have been escaping from the old workings.—*William Green, jun., Durham, April, 1862.*

Notes on the Rough-legged Buzzard.—A well marked specimen of Buteo Lagopus was shot at Fenham Flats, about the 21st of November, 1861, and was sent to Mr. R. Duncan, for preservation.—*Thomas John Bold, Feb. 25th, 1862.*

Curious habit of the Shrew.—A friend of mine, when shooting by the Ouse-burn, saw some object apparently struggling on the rocky and shallow bed of the burn. At this he fired, and on picking up his game, was considerably astonished to find that he had killed a black shrew, and a small fish. Probably the fish had been too strong for its captor, as they were apparently rolling over and over in the water and doing battle with all their energy.—*T. J. Bold, April, 1862.*

ADDRESS OF THE COMMITTEE TO THE MEMBERS OF THE TYNESIDE NATURALISTS' FIELD CLUB.

READ AT THE SIXTEENTH ANNIVERSARY MEETING, HELD IN NEWCASTLE-UPON-TYNE, THURSDAY, APRIL 10, 1862.

GENTLEMEN.—The Presidential chair having become vacant, through the painfully sudden death of Frederick H. Johnson, Esq., M.D., of Sunderland, it has devolved upon your committee to prepare the usual account of the meetings of the Club during the past year, and to make such observations as seem desirable, on other matters bearing upon the interests of the Club.

Before proceeding further, your committee deem it right to put on record their deep sense of the loss sustained by the Club, in the much lamented decease of their President, an event which has cast a peculiar gloom over the transactions of the year.

Dr. Johnson left his home on the morning of the 12th December last, to pursue, as usual, his professional duties. In the prime of life, and apparently in excellent health and spirits, no symptoms of illness gave him warning of his approaching end. In company with an old and valued friend, with whom he conversed by the way, with all his accustomed vivacity, he paid a visit to a patient, and while seated at the bedside, an unusual pallor was observed to come over his countenance, his head drooped, the hand of death was upon him, and in a moment more, the kindly heart, and the ever active brain, were silent and stilled for ever. "In his death," says a gentleman who knew him well, "Sunderland has lost one of her best and most distinguished men; few in any town, have possessed higher qualities of head and heart; a powerful intellect, a noble disposition, being linked with keen professional acumen, and the kindliest social nature; a warm devotion to science, and a love and knowledge both of art and literature, gave largeness to his views, and a vivid charm to his conversation." When elected President of this Club, he was only known to a few of us, but it was not long before his great and varied acquirements, his amiable and attractive disposition,

won the respect and admiration of all who came in contact with him. His regular attendance at our Field Meetings, often at much personal inconvenience, showed that he took no ordinary interest in the well-being of the Club, that he fully appreciated the honour that had been conferred on him, and that he was emphatically "the right man in the right place." He has in this respect, left an example to future Presidents, well worthy of imitation, and the following of which, will go far to secure the continued prosperity of the Club.

Had Dr. Johnson lived, we should undoubtedly have had a most excellent address from his pen; he was a ready and agreeable writer, and had, before his decease, commenced to gather materials for the purpose. We must all regret that the pages of our "Transactions" contain so few contributions from one so well able to enrich them. In our fourth volume (p. 117) will be found a short paper by him on some "Ancient Remains found in the river Wear, at Claxheugh," and the sketch which he read at our last meeting, at Marsden Rock, entitled "Obituary notices of the Toad, said to have been found embedded in the solid rock at Bishopwearmouth," was an excellent specimen of his lighter vein, and of the versatility of his powers. We trust that this essay may be found among his papers, and allowed to appear in our pages.

His public services and character are well summarised in the following extract from the *Sunderland Herald*, of the day.

"Before he had passed the dawn of manhood (and he had only just completed his 39th year at the time of his death), he had taken a prominent place amongst the best educated men of his native town, and through life he continued to be an enthusiastic student, keeping himself well informed, so far as attention to the duties of his profession would allow, of all the advancements in science, art, and literature. His was indeed the pen of a ready writer; few subjects that came within the ordinary range of comment or criticism were beyond the range of his mental powers. In humorous narrative and descriptive composition he particularly excelled, his most finished production, and one in which both these qualities were happily, although somewhat carelessly combined, being "A Winter's Sketches in the Pyrenees and South of

France." Numerous and varied were the capacities in which he sought to serve his fellow-men. While pursuing his medical studies at the Edinburgh University, he held the office of President to the Hunterian Society; he was an active member of the Sunderland Literary and Philosophical Society in its palmy days; was one of its secretaries for a considerable time, and contributed largely to the success of its once famous Winter Evenings' Recreations. He was one of the committee of the Subscription Library; and at the time of his death was President of the Tyneside Naturalists' Field Club, the first evening meeting of which, for this season, he attended in Newcastle-upon-Tyne, yesterday week. In connection with that association, a Geological class was lately formed in Sunderland, the meetings being held at Dr. Johnson's residence, and last night was to have seen the members once more assembled in the same place. For some years he was a member of the Town Council, and at the meeting of that body, on the very evening before his decease, he received a pretty large measure of support in his nomination as one of the new magistrates for the borough. Some years ago he was elected a director of the Sunderland Gas Company, and held that office up to his death. In the volunteer movement he took an active part, and on the election of officers, was chosen as surgeon to the Rifles. The warmth and genial-heartedness of his inner life was of course only known to a few; and for our own part, writing as we do with the recollection of many delightful hours spent in the society of the deceased, we can only express the hope that the special guardianship which is ever vouchsafed to the widow and the fatherless may be realised with a fulness sufficient to lighten the blow which has desolated the hearth of our departed friend."

His remains were interred in the new cemetery at Chester Stones, on Monday, the 16th of December. In accordance with a memorandum found among his papers, all display was avoided on the melancholy occasion; nevertheless, his remains werefollowed to their last resting place by a very large number of the members of his profession, of the officers of the Volunteers, and officers and members of this Club, as well as by many of his private friends, to all of whom he had endeared himself by the varied

and brilliant powers of his mind, the amiability of his disposition, and the urbanity of his manners.

From this melancholy theme we must now turn to review the Field Meetings of the year. Of these, six have been held in various parts of the two counties; all were highly successful, the weather on each occasion being everything that could be wished, and the attendance of members very numerous. Throughout our rambles we met with a courtesy, kindness, and hospitality which will long live in the memory of those who shared them. A hospitality which has ever flourished in the "north countrie," and especially on the banks of Tyne and in the vale of Wear.

The First Field Meeting was held at Newburn, on Wednesday, the 15th of May.

A fair number of members gathered at the appointed hour, and as the distance to the 'meet' was trifling, the usual assistance of train or carriage was dispensed with.

A brisk walk of three or four miles through a pretty country, brought the party to the first point of interest on the route, the Coaly Hill Dyke. Here they were joined by Mr. John Ramsay, of Walbottle, Mr. Spencer, of Lemington, and Mr. J. B. Simpson, of Ryton; and the first named gentleman, who had been good enough to bring with him plans and sections of the district, prepared for colliery purposes, pointed out the direction of the dyke and its geological features, and described the appearance it presents, and its effects on the seams of coal that are intersected by it, in the neighbouring collieries.

Very little of the Basalt itself is now visible in the dyke at Coaly Hill, it having been excavated for road making and other purposes, to such a depth that it is almost concealed by water which has collected in the workings, but the vertical surfaces of the shales, and coal seams, with which it has come in contact, are well preserved, and its effects on these are very remarkable. These surfaces give abundant evidence of the action of the heat to which they have been exposed. The seam of coal which is about three feet in thickness, has been converted for many feet from the surface of the dyke, into a coke or cinder, consisting of small hexagonal columnar prisms lying horizontally,

and placed according to the universal law, at right angles to the line of pressure.

In the shales a few fossil ferns are to be met with, and stems of stigmaria, with rootlets, in the bottom clay.

After a short walk across the fields, the party arrived at the "Coronation Pit," where the dyke had been cut at a considerable depth from the surface; large quantities of the basalt so worked, had been brought to bank, where it was carefully examined by the mineralogists who obtained specimens of felspar, and other crystals, usually associated with basalt.

It was now the turn of the botanists and entomologists of the party, to pursue their peculiar studies, and the upper part of Walbottle Dene, then richly adorned with spring flowers in their prime, was found to be an attractive and beautiful field of research. Primroses, wild hyacinths, wood anemones, the tender, green, opening fronds of ferns, several of the *stellarias*, the little *adoxa*, *geum rivale*, and other spring flowers of common occurrence were gathered.

Where the west turnpike crosses the Dene, the former became the line of march, the next *rendezvous* being Walbottle Colliery. On either side of the road, the ditch and ramparts of the Roman Wall are distinctly visible, running straight as an arrow up hill and down dale, and despising that bending to circumstances which distinguishes our modern iron roads.

At Walbottle the plans and sections of the colliery were examined with much interest, and carefully and clearly explained by Mr. John Ramsay, to an audience whose ignorance of colliery terms, and technicalities, made the task a more arduous one than common. No such difficulties presented themselves in the next duty which the kind and thoughtful hospitality of Mr. Ramsay had prompted him to undertake, and *that* justice was done to luncheon at his residence, which has never failed after a long country walk, to distinguish the members of this Club.

Fine views of the vale of the Tyne, and the Fells which give it birth, were obtained from the garden, and other "coins of vantage" in the neighbourhood.

Hunger being appeased, "the Pit" was now the cry, and a

number of the members traversed its dark and gloomy depths, the rest like Sir John Falstaff, "babbled o' green fields," and decided to complete the exploration of the dene. The beautiful fronds of the oak and beech-ferns, rewarded their search, and many species of the smaller land snails were collected, among which were *Helix alliaria*, *lucida*, *nitidula*, *radiata*, *fusca*, *fulva*, *Azeca tridens*, *Clausilia nigricans*, *Vitrina pellucida*, &c. In this group of animals, the dene appears to be peculiarly rich. Insects were remarkably scarce, a single specimen of the common white butterfly, represented the Lepidoptera, and among the Coleoptera, although our local carab, *Pterostichus parumpunctatus* was more than usually abundant, there was a general dearth, the only specimens thought worthy of capture being *Lestera bicolor*, and *Lathrimeum atrocephalum*, two of the smaller *Staphylinidæ*.

Near the foot of the dene, the subterranean explorers joined the others, and all went together to visit the extensive Steel Works of the Messrs. Spencer, who threw them entirely open to the party, and explained the many interesting and beautiful operations conducted in them. Steam hammers of tremendous power, by Nasmyth, Morrison, and others, were seen at work on embryo Armstrong guns; these, and the skill and rapidity of the file cutters, attracted especial notice.

The dinner hour being near at hand, a hurried inspection of the church of St. Michael at Newburn, was all that could be accomplished.

From the church-yard, one of the finest views of the Tyne valley is obtained, a view which few rivers can equal. The richly wooded banks, and glistening spire of Ryton, the castled knoll of Prudhoe, the Saxon towers of Ovingham and Bywell, and the dark Fells behind them all, form a picture an artist would gladly paint. After dinner, eighteen new members were elected, and the following papers were read, viz:—

I.—"Short notices of interesting facts connected with the Marine Zoology of our Coast," by Mr. Richard Howse.

II.—"Additions to our local Coleopterous Fauna," by Mr. Thomas J. Bold.

The meeting broke up, after according to Mr. J. Ramsay, and

the Messrs. Spencer, the hearty thanks of the members present, for their unremitting attention and kindness throughout the day.

The Second Field Meeting was held at Seaham and Hawthorn Dene, on Wednesday, the 12th of July. Arrived at Seaham, the numerous party at once divided into two sections, one following the course indicated on the programme, visited the ruin of Dawden Tower, now almost a nonentity, the old wall which alone remains forming part of a farm-yard enclosure, in fact, sad to relate, it is the division between the rick-yard and the piggery. It was the seat of a branch of the Bowes family; an altar tomb of a member of which, in very good preservation, is in Dalton Church, carved in the soft magnesian limestone of the district; it is a recumbent figure, with the arms on the breast-plate.

That ruins of this nature should ever be allowed to be degraded to such ignoble uses, is greatly to be regretted; such acts of barbarism deserve the severe reprehension of a Society like ours; it is one of our express objects to strive to protect these relics of a bygone age and people, which as such, should be treated with respect, and preserved from destruction and desecration.

Passing through the picturesque dene of Heselden, they came up with the other division, who had been exploring the sea-shore. Here many rare and beautiful objects for the aquarium and microscope had been collected; among the zoophytes, *Tubularia larynx*, *Bicellaria ciliata*, *Bugula plumosa*, and among the molluscs, *Acmæa testudinalis*, and *A. virginea*. Fronds of *Delesseria* were also met with, to which were attached immense quantities of *Isthmia* and other diatoms.

The coast line south-ward from Seaham, is exquisitely beautiful, and of much geological interest. The lofty magnesian limestone cliffs are capped here and there with the great glacial boulder drift, and intercalated with beds of the peculiar botryoidal limestone, characteristic of some portions of these rocks. A tuft or two of *Asplenium marinum* were seen, the last remnants of this once plentiful fern.

At the entrance to Hawthorne Dene, the party was met by the High Sheriff of the County, (R. L. Pemberton, Esq.,)

and conducted by him to Hawthorn Tower, his country residence, where upwards of forty members sat down to a "dèjeûner à la fourchette," bountifully provided with all that hospitality could suggest.

This dispatched, the President read a paper by Mr. Tuffen West, F.L.S., "On the Seeds of Plants as objects for the Microscope," and as this will not appear in our "Transactions," since it treats of matters of general, and not purely local interest, a short epitome of it may be introduced here.

"The structure of the seeds of plants," says Mr. West, "has engaged much of the attention of scientific botanists, and by these its great importance is well understood, but to the microscopist who uses his instrument to expose the beauties of creation in its minuter parts, seeds are a complete 'terra incognita,' they are scarcely known to the professional mounter of objects, and even in works devoted to the microscope, they are passed over with a brief list of such as are pretty when viewed with low powers, but little more is to be found respecting them. The cause of this neglect seems incomprehensible, for an inexhaustible variety of beautiful objects is readily to be obtained. The colouring of the seed vessels is often rich, and in the mechanical provisions for the protection of the young germ, for facilitating its transport to various localities, and for allowing a thick flinty coated seed the access of moisture, is a field of research full of attractive details. . . . . The seed, or young germ, is protected by several seed coats, (testa) generally three, and the best way to examine these, is to try and obtain portions of each coat separately, and then by a very thin transverse section to get, as in a mass of strata, their relative order of superposition, the thickness of each stratum, and the number of layers entering into its composition. Sections may easily be made with a sharp razor, small seeds being fixed in a slit cork, or—slightly moistening it first, to prevent their sticking to it—in bees-wax melted on the top of a cork. Seed-coats are best obtained by tearing with a needle, on a slide, or boiling for a short time in a test tube in water, acidulated with nitric acid; but some are as hard as flints, and require grinding like teeth and bones." Mr. West then

describes the appearance and peculiarities of some of the commoner seeds, as chickweed, cowslip, primrose, hemp, &c.; beautiful and excellent drawings of these, illustrated the paper, and he concluded by offering his assistance to any of our members who may feel inclined to take up the subject.

Mr. Richard Howse, then made some remarks on the continued progress of the southward march of *Acmœa testudinalis*, and he was followed by Mr. E. C. Robson, who dwelt at some length on the Botany of the district.

Mr. George Hodge exhibited a series of the rarer star-fish, *Ophiura texturata*, and *O. albida*, *Ophiocoma rosula*, *O. bellis*, *O. neglecta*, *O. Goodsiri*, and *Uraster glacialis*, observing that the latter species has not before been recorded as a native of our coast; and is elsewhere considered a comparatively rare species, adding "my impression however, is that it will be found of frequent occurrence, and that the reason why other observers have not recorded its capture, may be traced to the fact that fishermen as a class, have a very great aversion to starfish, on account of their taking the baited hooks, and thus preventing fish being caught, and out of revenge, the fishermen tear the poor star-fish asunder when caught, and then throw them over-board; the collector therefore seldom has the chance of obtaining a specimen from the fishing boats, and being only found in moderately deep water, no other opportunity presents itself. This is very likely to happen with *U. glacialis*, as from its resemblance to commoner forms, the fishermen naturally imagine that nothing can be got for so common a creature, and consequently do not save them. This species attains a very large size, I have frequently taken specimens measuring fourteen inches from the tip of one ray, to that of the one opposite. A peculiar feature about it, not mentioned by Forbes, is the arrangement of the spinules or pedicellariæ which in the living animal are placed round the summits of the dorsal and lateral spines, in a very elegant manner, producing a beautiful rosette, this appearance is not seen in a dried specimen." Mr. Hodge next exhibited a specimen of the rare and interesting *Uraster hispida* captured at Seaham, specimens of which our local naturalists have seldom had an opportunity of seeing. It differs

however so decidedly from all other species, that although from its rarity, Mr. Hodge had not been able to compare his with authenticated specimens, there can be no doubt of its being the "Little Cross Fish" of Forbes.

After some further remarks on these and other topics, the President rose to propose a vote of thanks to the High Sheriff for the eminently hospitable reception he had given to the Club, which having been courteously responded to, the whole party resumed their explorations of the dene and neighbourhood, dividing again into two bands, one, headed by Mr. Pemberton and the President, devoted themselves to the botany of the dene, collecting excellent specimens of the Fly orchis, *Ophrys muscifera*, now scarcer than it used to be in the district, *Gentiana campestris*, and *Primula farinosa*, very fine and plentiful, *Valeriana dioica*, abundant in the boggy bottoms of the dell (a plant so common on our east coast that it hardly deserves mention), the Spindle Tree, *Euonymus europæus*, and many other interesting plants. The other section under the guidance of the Rev. George C. Abbes, made for the Beacon Hill, about two miles south of Hawthorn, from which there is a splendid view of the surrounding country. Among the insects captured in the dene a specimen of *Corymbites castaneus* one of the rarer *Elateridæ* is deserving of note.

The Third Field Meeting was held at Bellingham, on the 16th of July, and though the morning was damp and gloomy no less than seventy-five members arrived by train at Bellingham, the "Furnace Inn" was at its wits end to satisfy its hungry guests, and the whole village turned out to stare at the invading host. Up North Tyne however, the Club has always found, that plentiful provision is never wanting, let their numbers be as large as they may, and so by dint of the untiring zeal of the host, and the good-natured forbearance of the guests, all were comfortably supplied, and as detachment after detachment left the breakfast table, they wandered towards the church, where Dr. Charlton was ready to explain to them its many points of interest.

These he has kindly jotted down for our use, and we gladly enrich our pages with them here.

Notes on Bellingham Church. By Dr. Charlton.

Bellingham Church is an ancient structure, consisting of a chancel and nave, with a chantry on the south-side.

The nave is covered by a remarkable stone roof, of which very few examples exist in England. It is semicircular, and traversed from side to side by hexagonal ribs of stone, about two feet ten inches apart. These ribs are covered by heavy grey stone slabs, and the whole is so ponderous a structure, that numerous buttresses are required outside to support the roof. The chancel has had a wooden roof, and is without buttresses. The tradition of the country is that the chancel was twice burnt by the Scots during the Border Wars, but we find no record of this outrage in the State papers of that period. The chancel was, however, unroofed and ruinous in 1609. The extremely narrow windows of the nave, (they were formerly even narrower than at present) would make the nave available for purposes of defence, as in some of the Cumberland border churches, where the steeple was apparently built with this intention. The doors which were probably barred with iron, were secured internally by three massive bolts. The chantry chapel on the south side, (it is probably the chapel of St. Catherine mentioned in old records) is likewise stone roofed, and contains a piscina and a bracket for a statue. The altar of the chantry stood under the east window of the chapel. Within the last few years, the floor of the church has been raised some few feet, to the utter destruction of its internal proportions, and a *building*, for we can give it no other name, has been erected at the west end. The earth round the church has been raised by repeated interments, to a great height.

An official report of the state of Bellingham Church in 1607 is to be found among the MSS. of the library of the Dean and Chapter of Durham, and by it we learn, that the church in that year was in a deplorable condition.

"The Communion is but ministered once during the year. They lack the book of Common Prayer, with the Calender, a Byble, Psalters, two books of Homilies, ye Table of Commandments, a seat for their minister, a surplesse, a decent communion

table, a cloth and covering for it, a Communion cup and cover, a box or chist, and the book of Canons, and the Font is broken. They have neither bell nor doores, none come to be catechised, yet they never gave any presentment of non-communicants. Their Clerk can neither read nor write, but hath one that supplieth the place for him."

Shortly afterwards, the party was joined by W. H. Charlton, Esq., of Hesleyside, and the route was then decided upon. Under the leadership of that gentleman, whose ancestors so often led the raids and forays of the Border, with objects less peaceable than ours, they followed the course of the Hareshaw Burn, scrambling along its rocky bed, passing the side of the now silent and deserted iron-works of Hareshaw, and pausing every now and then to admire the great beauty of the glen, whose banks are clothed with luxuriant vegetation, save where the rock pierces the surface, and varies the scene with cliff and crag. The stream itself brawling at their base is broken by many linns or falls, charming eye and ear with their form and music, and on its brink the lovely wood vetch (*Vicia sylvatica*) then in full blossom, was growing in profusion.

At last the Hareshaw Linn was reached. Here the beauties of the glen culminated; recent rain had swelled the stream to more than its usual magnitude. Stray sunbeams stealing down into the dark recesses of the glen, and glistening on the spray, turned it into rainbows, flitting changefully over the cascade.

The little Dipper (*Cinclus aquaticus*), seldom absent from the waterfall, was not wanting here, and the dark overhanging cliffs which encircle the basin of the fall, on which the raven was once accustomed to rear her young, were clothed with ferns, the brittle, beech, and oak ferns, the black maidenhair, and many other kinds. The route now lay straight away over the moors to the Haws Crags, and the fresh mountain breeze scented by the sweet perfume of the heather, greeted the party as they pushed on at a rapid pace. The scenery was as wild as could be desired, no cultivated

ground could be seen, and every now and then the whirr of the grouse, and the wild cry of the curlew, were heard resenting this unwelcome invasion. The next halt was called by the side of a small streamlet which issued out of the hillside, and not till all were again collected, was the march resumed down the hill and into the valley of the North Tyne, which is still clothed with patches of wood, the remnants doubtless of ancient and much vaster forests of oak, alder, and birch, the prevailing trees in all the sub-alpine vallies of Northumberland. Here, as in most cases, they are gnarled and twisted into strange and grotesque forms. In many of the trees the larva, pupa and imago of the Longicorn coleopteron (*Rhagium inquisitor*) were found.

Passing through the woods, and across the New Border Counties Railway, which will soon take us up to, and over the Scottish Border, to districts well worthy of the explorations of the Club, the Tyne was crossed by a foot bridge, and the party found themselves in the grounds of Hesleyside. An hour was spent by some, in the beautiful gardens, others wandered up a wild path through the woods behind the house, which skirts a tiny streamlet overhung with rock and canopies of fern, and visited the kennels, whose noisy occupants were much admired. A few of these were taken out by the keeper, and flushed some black game for the amusement of the visitors.

Returned to the house they found dinner awaiting them, and sat down, one hundred and one in number, to tables literally groaning with good things. None can doubt that at Hesleyside, at any rate, hospitality reigns as supreme as in the olden times, it beamed forth in the smile of Mr. Charlton when informed of the number of his guests, and was eloquent in his reply of "the more the merrier."

Our late worthy President in fitting terms thanked their host on behalf of the party, and proposed his health, which was drunk with all the honours. Mr. E. C. Robson proposed the "Ladies of the House," to both of which Mr. Charlton responded, and then all retired to the terrace before the house, where Dr. Charlton read a paper on the "Ornithology of the North Tyne," which has since appeared in our "Transactions." Dr. Dodd followed

with another paper "On the Origin and Etymology of Local Names of Places," specially referring to those in the immediate neighbourhood.

By the time these had been read and discussed, and twelve new members elected, the time had come for the party to retrace their steps to Bellingham, where also his duties as Captain of the Bellingham Volunteer Rifle Corps called their hospitable entertainer. There they watched the corps at drill until the hour of departure, and found them almost without exception, men of such stature, and powerful build, as to prove themselves worthy descendants of those who in days gone by, followed the Chieftains of Hesleyside, and apparently well able to maintain the reputation of these for strength and prowess.

Among the insects captured, may be mentioned *Telephorus cyaneus*, at Hareshaw Linn, *Agabus guttatus*, in the high moorland drains, and *Rhagium inquisitor*, before noticed. The geologists observed a few fossils in the shales, on the banks of Hareshaw Burn.

Long will this meeting be remembered by the Club, nor will they soon forget the host, who gave them such a true Northumbrian welcome.

The Fourth Field Meeting was held at Alnwick, on Thursday, the 29th of August, to meet, by invitation, the members of the Berwickshire Club. The many and varied attractions of the occasion, among which were prominent the desire to cultivate the good fellowship of a kindred body, the liberality of the Duke of Northumberland in throwing open the castle, the many objects of interest to the antiquary in the town itself, and to the geologists in the immediate neighbourhood, brought together such a gathering of the members of both Clubs, as had never been seen before by either of them. One hundred and twenty men from all parts of the Border, and of the two northern counties, invaded the quiet grass grown streets of Alnwick. Men of all ranks, opinions, and professions were there, receiving and communicating new ideas and information, and doing much to promote that kindly feeling which Clubs like ours may so much encourage.

The many interesting points in the history and antiquities

of Alnwick were discussed while breakfast was preparing, for Alnwick yet retains many of "the customs that prevailed in remote times. Thus, the Curfew bell still rings out into the night, its warning tones, (awakening with its echoes, thoughts of the fierce Borderers who kept up the terrors, this Norman institution sought to allay.) Again, the ancient custom of watch and ward, is still observed at the great annual fair held in July. On the Sabbath evening preceeding the fair-day, the adjacent townships, which owe suit and service to the Lord of the Manor, send their representatives to assist in keeping watch at the different entrances into the town, lest the Scots, (or may be the Tyneside men, bent on less peaceful errand than that for which Alnwick was indebted for their company on the present occasion,) should make their appearance. Chatton and Chillingham send four men; Cold-Marten and Fowbery four men; Hetton and Hazzlerigge, four; Fawdon and Clinch, four; Alnham and Alnham Moor, two; Tughall and Swinhoe, two; Longhoughton and Denwick, four; Lesbury and Bilton, two; and Lyham and Lyham Hall, one man. This goodly company with the constables and some of the tradesmen of the town, proceed to the castle, where they are received by his Grace the Duke of Northumberland's steward and bailiff, and are hospitably refreshed." Among the antiquities of the town, most of which were visited, may be mentioned some ancient houses, the most important of which stands on the north side of the Narrowgate, and is easily distinguished by a bas-relief, displaying the crescent and fetlocks of the Percies, as illustrated by Mr. H. W. D. Longstaffe, in his Heraldry of the Ancient Percies, (Arch. Æliana). It is a two storied quadrangular building, having, in the front facing the street, an archway, which leads into the open court yard in the centre. The street front has been converted into two shops, so that its ancient appearance has suffered much. The massive walls, with their small window openings, the stone staircase, the huge oak beams protruding from the ceilings, fragments of stone-carving, and traces of a chapel, however, remain to invite further investigation. A second ancient house at the head of Cannongate, is said to have been a meeting-house in the reign of James II. It has been converted into dwelling-houses, losing

in its transformation, much of its interest. A third ancient house stands on the east side of Clayport, from this, the mullions of the windows have not yet disappeared.

The ancient parish church is in the perpendicular style, and consists of a nave with aisles, a chancel and a tower, all possessing embattled parapets. The south-east angle of the chancel presents peculiar details that are full of interest. The Hotspur Tower, that massive archway which spans the southern entrance to the town, is too striking an object to be missed by the most unobservant. Lastly there exists in Watergate, the remains of a Chantry.

After breakfast, which, owing to the large gathering, and the absence of that happy power of meeting emergencies, which we have noticed as characteristic of the hostels of North Tyne, was of a somewhat meagre character, the Berwickshire Club held their usual meeting for business, one part of which deserves mention as an example worthy of imitation. An effort was made (which we trust has been successful) to raise a sum of money to defray the expense of excavating and fencing in, the valuable Saxon building called Dun Edin's Hall, or Woden's Hall, near Abbey St. Bathan's, the property of Captain Munro, which at the time, was in danger of serious dilapidation.

Then the whole party proceeded to the castle where the Rev. Dr. Bruce explained to them the salient features of the architecture of the exterior, and improvising a rostrum of every scattered heap of building materials, recounted, in an interesting manner, the age and history of each portion of the building. He pointed out the leading features of the restorations, and showed where in excavating the soil to open out the bases of the postern tower, the foundations of the ancient "bake house, slaughter house, priest's house, and midden," had recently been uncovered. Further details from us are, however, unnecessary, as we have been favoured with a most valuable and interesting description of the castle, by F. R. Wilson, Esq., architect, of Alnwick, which we have great pleasure in inserting here, and which is accompanied by explanatory plans, for permission to use which, we have to thank Mr. Davison of Alnwick.

DESCRIPTION OF ALNWICK CASTLE.

GROUND PLAN IN 1650.

1. Water Tower. 2. Garret. 3. Stables, not now existing. 4. Exchequer house, not now existing. 5. Garret. 6. Abbot's Tower. 7. Falconer's Tower, pulled down in 1860. 8. Outer Ward or Ballium. * Caterer's Tower. 9. Middle Gateway. 10. Inner Ward or Keep. 11. Armourer's Tower, pulled down in 1860, together with the curtain wall below it, and the Falconer's Tower adjoining. 12. Edwardian Octogon Entrance Tower. 13. Postern Tower with Sally Port, now occupied as Museum of Roman and British Antiquities. 14. Garden Tower. 15. Middle Ward. 16. Chapel (not now existing). 17. Conduit. 18. Constables Tower, now occupied with a collection of accoutrements of the Ducal Yeomanry Cavalry. 19. Garret. 20. Ravine Tower, not now existing, the new wall in its place called the Bloody Gap, and a garret, adjacent Hotspur's Chair. 21. Record Tower, the upper floor is now occupied as a Museum of Egyptian Antiquities, the lower floor for records. 22. Stream from the moors called the Bow-burn, now covered. 23. Moat now filled in, but the ancient retaining wall exists several feet below the surface. 24. Draw-bridge. 25. Entrance Barbican.

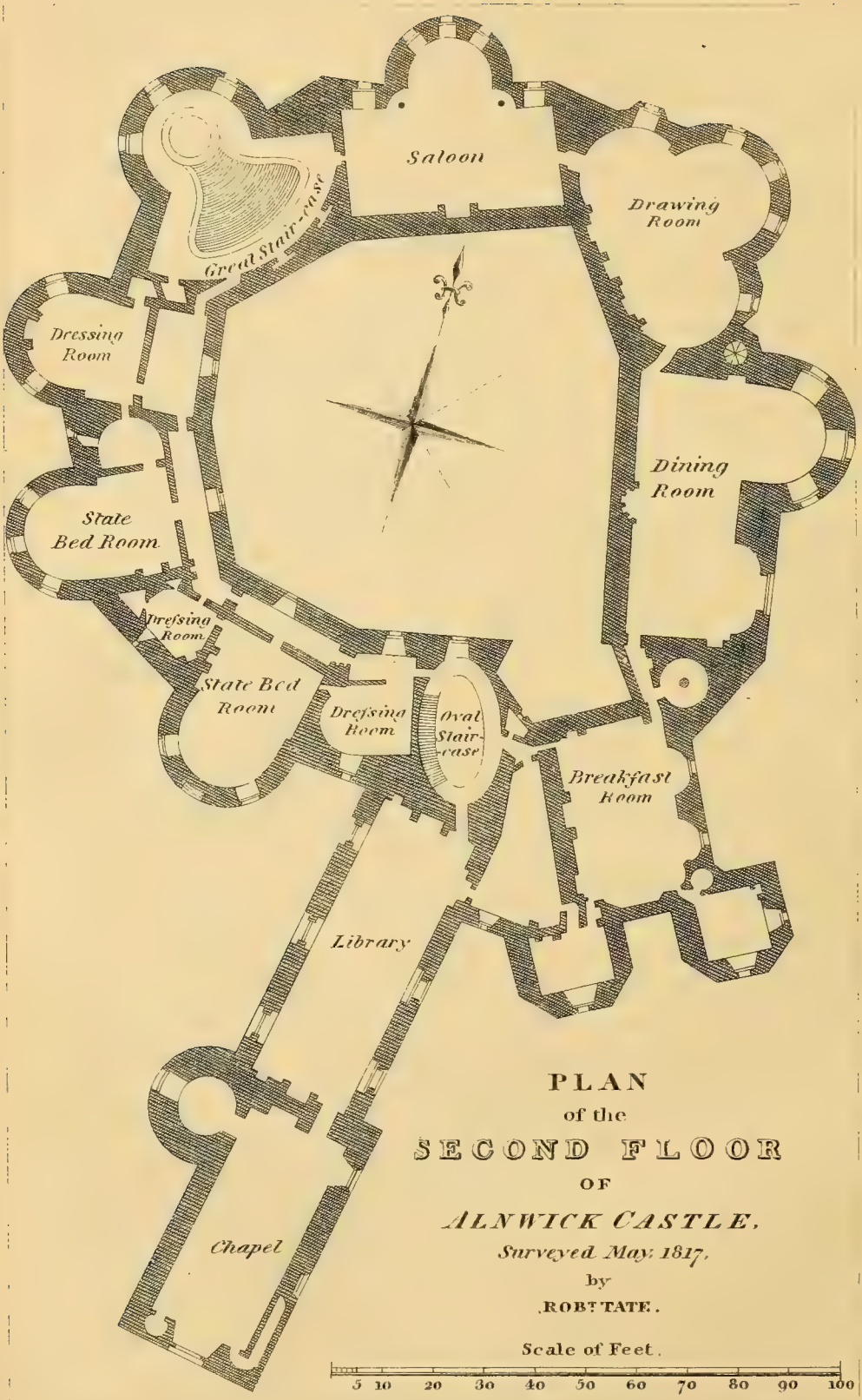
Alnwick Castle. By F. R. Wilson, M.R.I.A., Member of the Northern Architectural Association, &c., &c.

The history of Alnwick Castle may be read in its masonry. Fragments of the Norman curtain-wall, distinguishable by its even courses of small white stones, mark the extent of the enclosed space in the Norman fortress, and the presence of an inner Norman vaulted gateway denotes the site of the Norman keep. We may next see in the Edwardian masonry—in which much larger

stones, used indiscriminately with those of a smaller size, were laid in courses of irregular heights—the alterations effected by Henry Percy, first Lord of Alnwick, after the transfer of the barony. Where the Norman wall was sound, he surmounted it with a parapet; the other portions he rebuilt, and gained further strength and size by erecting new garrets and towers at intervals along its course. The Barbican is part of the work of this period, as is that part of the keep which contains the arcaded draw-well. The keep, at this time, consisted of a ring of towers connected together by short lengths of curtain wall. One of these towers, that containing the dining hall, was built by this lord of Alnwick, for on the removal of the plaster work in the present renovations the ancient hall was found—still retaining the marks where the dais was formed, the hooks in the walls that upheld the tapestry and other vestiges of the rude magnificence of the social life of the age; but whether the remainder of the towers of the keep were Norman or Edwardian, it is now impossible to say, as they were rebuilt in the alterations made by Hugh, first Duke of Northumberland, in 1764. The two octagon towers on either side of the Norman entrance into the inner ward of the keep, appear not to have been completed during the lifetime of the Percy who acquired the barony, as they are ornamented with a series of escutcheons, one of which is charged with the armorial bearings of the Cliffords, who were not allied to the Percies till his son, the second lord of Alnwick, married Idonea, daughter of Robert, Lord Clifford. As the first Lord of Alnwick did not survive the transfer of the barony more than five years, we may assume that these towers were finished by his son at a subsequent period. An old plan of the castle, which, by the courtesy of Mr. William Davison, of Alnwick, is permitted to illustrate these notes, gives us a clear idea of its ancient conformation—which, we may add, remained undisturbed till the alterations of the last century. It will be perceived that several buildings were reared within the walls, of which no trace remains. Immediately within the Barbican stood the Exchequer or Checker house, close by stood "thre fayre stabylles" for the accommodation of eight score of horses, and in the middle ward a chapel occupied

a third isolated position. These had all fallen into decay, and were removed prior to the renovation in 1764.

A century ago, in the fashion set by Horace Walpole, at Strawberry Hill, the Duke and Duchess of Northumberland re-modelled Alnwick Castle. The keep—until then, separate towers, furnishing separate lodgings—was consolidated into suites of large apartments, leading through one to another. Three only of the ancient towers were retained; the octagon towers and that containing the great hall, which latter was converted into a dining room. The ceilings of the new apartments were formed of plaster fan-tracery of a highly ornate character, the window openings were filled with pointed-headed sash-windows, the chamber doors were headed with four-centred arches and decorated with mouldings following the same outline. Although these decorations have been removed, and Strawberry Hill has been dismantled, their type is still in existence, for one room in the castle has been retained as a *souvenir*, and the chancel of St. Mary's Church, Alnwick, embellished at the same time in the same style, may be fitly regarded as a monument to the memory of the earliest manifestations of the revival of an appreciation of Mediæval art. An examination of the second plan will afford a realization of the alterations that were made at this period in the keep. These were, besides, the Record Tower, the Caterer's Tower, and Water Tower built on the line of circumvallation; the fallen Ravine Tower removed, and the line of wall carried over its site—the new patch of masonry being known as the Bloody Gap; and a large group of new kitchens built upon the bank of the moat, on the south side of the castle. These renovations and additions were considered very handsome at the time of their consummation, but they perpetuated two faults—apart from the style in which they were executed. The towers of the keep were of one height, spiritless and uniform, the state chambers had no access, save by traversing each to gain the next.



PLAN
of the
SECOND FLOOR
OF
ALNWICK CASTLE,

Surveyed May: 1817,

by

ROBT TATE.

Scale of Feet.

5 10 20 30 40 50 60 70 80 90 100

DESCRIPTION OF ALNWICK CASTLE.

PRINCIPAL FLOOR PLAN IN 1861.

1. Library in Prudhoe Tower. 2. Ante-room. 3. Saloon, with ceiling partly taken from St. Peter's, Rome. 4. Drawing-room, with ceiling from St. Peter's, Rome, and friezes from paintings by Giulio Romano, in the Commendante's apartments in the Castel Sn. Angelo. 5. Dining-room, an exact reduced copy, from ceiling in the choir in the basilica of Sn. Loronzo, outside the walls of Rome. 6. Chapel, with mosaics taken from the pulpit in the same basilica. 7. Ducal pew or Gallery. 8. State Bed-room. 9. Dressing-room. 10. State Bed-room. 11. Dressing-room. 12. Breakfast-room, the ceiling and decorations remain as placed by Sir Hugh Smithson, as a specimen of the period. 13. Vestibule and Grand Stairs. 14. Corridor. 15. Serving-room. 16. The Duchess's Boudoir, with ceiling taken from the Camera Borgia in the Vatican. 17. The Duchess's Dressing-room, with rich plaster ceiling. 18. The Family Bed-chamber. 19. The Duke's Dressing-room. 20. The Duke's Sitting-room facing the south, with Ball-room adjacent, and private passage to the Commissioner's Offices. 21. Dinner Lifts. 22. Dinner Corridor.

In the third plan, the new works are illustrated. The two faults indicated above, are here obliterated. The new Prudhoe Tower, built on the site of one of the uniform towers mentioned, rises above the rest of the grouping of the keep; and a corridor, lining the inner ward, and supported on arches and corbels, furnishes convenient access to the new state rooms. The decorations of these apartments have introduced a period of foreign art into this country, of which little was previously known. They have also introduced a controversy as to the propriety of disturbing associations of ideas, connecting the ancient Percies with their ancestral home, which as forming part of the history of the present restoration, need not be altogether ignored. The theme of the chosen decorations is a reproduction of the phase of decorative art desig-

nated "Cinque Cento"—such as that with which Raphael adorned the Loggia of the Vatican, and with which Giulio Romano embellished the castle of St. Angelo—that which Leonardo da Vinci practised, and Michael Angelo approved. The work must be considered to be that of the late Commendatore Canina, than whom no greater authority upon Italian art ever touched pencil, for although Signor Montiroli, as his successor, has superintended the minutiæ of the work, the general scheme was laid down by the Venerable Commendatore, who, within the last few weeks of his life, journeyed from Rome to Alnwick, to plant—as it were with his own hands—this off-shoot of classic art.

On entering the keep, from the inner ward, the members found themselves in an entrance-hall at the foot of a grand staircase which was occupied by the scaffolding of the plasterers. The staircase, fourteen feet wide, wrought of Rothbury stone, terminates in a vestibule, whence a corridor gives access to the state apartments, and whence an ante-room affords an approach to the library. It was to this room that the members of the Clubs were first conducted. They found the richly carved, coloured and gilded ceilings completed, but the remaining portions of the decorations unfinished, and temporary book-cases in possession of the centre of the room. They could see, however, the dimensions of the chamber, and the massiveness of the masonry, in which is formed a winding stair to lead to an upper-tier of book-cases. Returning to the ante-chamber, the party was then shown the suite of apartments comprising saloon, drawing-room, and dining-room. The ceilings of these rooms were also completed, as well as the inlaid dados, and the sculpturesque marble chimney pieces, from Rome, were also in their places. The ceilings of the saloon and drawing-room, resemble that of the library, in so far as they are panelled, and coffered, and further ornamented with foliated wood carvings, which are enriched with colours and gold; but the dining-room ceiling differs from them in retaining the natural colour of the pine and cedar woods, of which it is wrought—an arrangement which, while it displays the beautiful carvings to advantage, affords an agreeable diversity to the eye. The chapel was also visited and admired. It will be remembered

that the ancient position of the chapel was isolated in the middle ward; that which replaced it was erected in a portion of the work thrown out from the keep to the gateway of the middle ward; the present chapel is incorporated with the towers of the keep from which it projects with an apsidal termination. The gallery of the chapel is on the same level as the state apartments, and is the space reserved for the ducal circle; the ground floor is approached by a lower and separate entrance, and is to be appropriated to the accommodation of the numerous members of the household. The roof is of groined stone, with bosses carved in the mediæval style; the decorations below the lancet-formed windows consist of a *fascia* of Italian mosaics.

The private apartments are decorated in a style scarcely less gorgeous. The ceiling of the Duchess's apartment is panelled, and coffered, and enriched with carvings, in the same manner as the saloon, drawing-room, and library—in which, it must be observed, a due variety is observed both in design and in the preponderance of different hues in each ceiling. The bed-rooms and dressing-rooms are ceiled with plaster, modelled after Italian designs, some of which are also coloured and gilded, others are left colourless.

The kitchens were viewed with great curiosity, as they are treated in the old baronial manner, and are thus a link between the hospitalities of feudal times, and the more elegant entertainments of the present.

To resume our account of the movements of our party—the Museum of British Antiquities was visited and carefully examined, containing, as it does, many most valuable and interesting relics of the ancient British people, and of the Roman occupation of our island, as well as the fine Saxon cross taken from the ruined church at Alnmouth, on which are many sculptured figures, and an inscription in mixed Saxon and Runic characters.

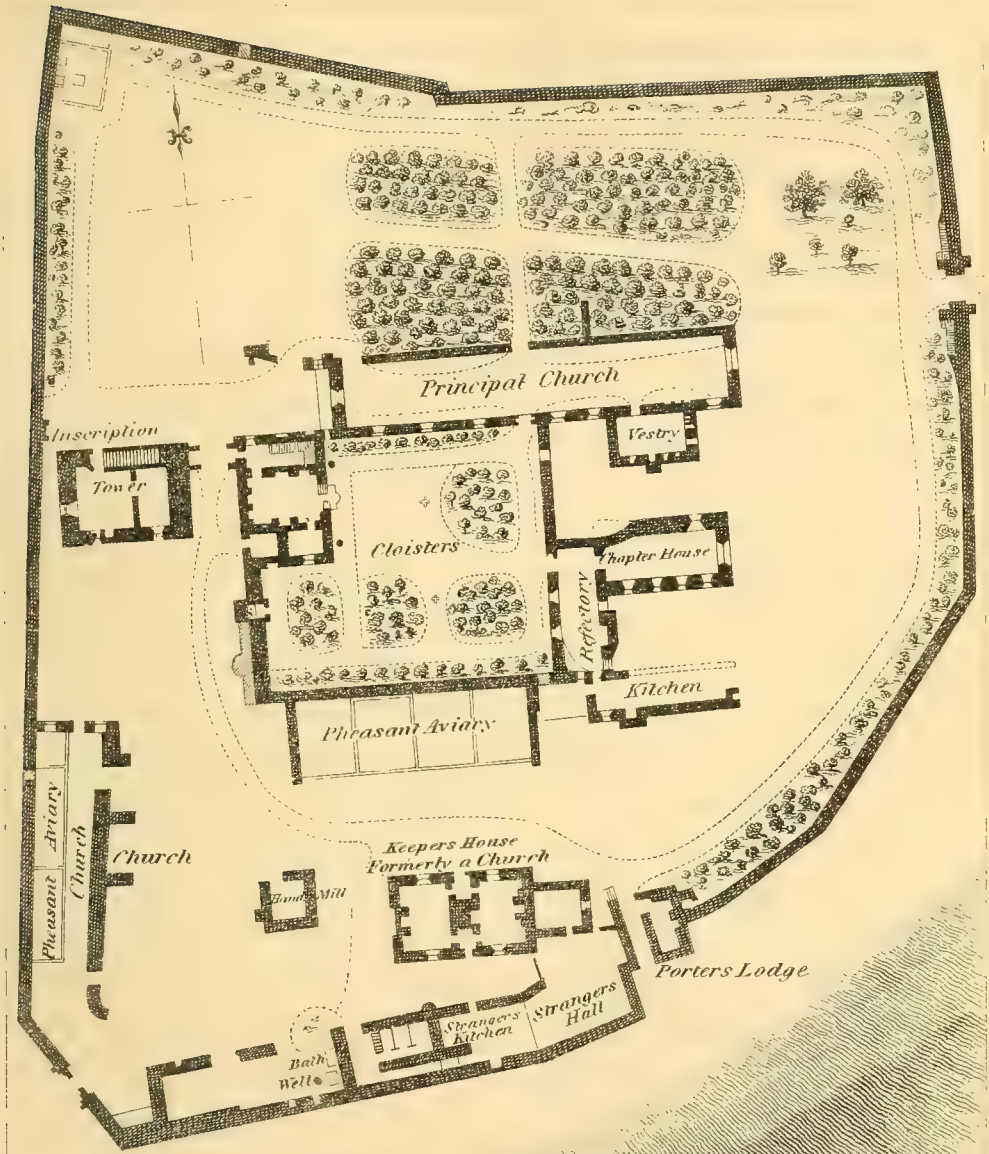
In these pursuits, and during the whole day, they had to acknowledge the kind assistance and attention of Mr. Holland, the Duke's bailiff, and of Mr. W. Dickson, of Alnwick.

The gratifying announcement was then made to them by Mr. Holland, that his Grace the Duke of Northumberland would meet the party in the Egyptian Museum, and himself explain its treasures; thither then they directed their steps, and were most courteously received by his Grace, who in a deeply interesting discourse, explained the history and uses of the more important specimens in the museum. The Duke's thorough knowledge of this branch of antiquarian lore is well known, and rendered his descriptions full of information and interest.

The President of the Berwickshire Club, D. Milne Holme, Esq., of Wedderburn, having thanked his Grace on behalf of the Clubs, for the reception he had given them, the party withdrew to follow out the remainder of the programme. Leaving the castle by the Barbican, they divided, one company led by our late President, and Mr. F. R. Wilson, of Alnwick, took the road to Hulne Abbey, and to the latter gentleman we are again under great obligation, for the following account of this part of the day's proceedings.

Hulne Abbey. By F. R. Wilson, Esq.

The remains of Hulne Abbey—a picturesque relic of early English Architecture, are on the banks of the Alne, about three miles N.W. of Alnwick. The route lay through the lands once belonging to Alnwick Abbey—of which building a gateway is the only landmark. This was, however, surveyed with interest, notwithstanding that the workmanship is of the Perpendicular period, and consequently must have been comparatively new on the suppression of the Abbey. Crossing a bend of the river, by the Monk's bridge, the party proceeded through the richly wooded park till it halted at "Ye Laydye's Well" to drink of the water, and to admire the height and grandeur of the silver firs which grow around; after this, it neither tired nor tarried till it stood before the portals of Hulne Abbey. The ecclesiastical buildings are in ruins, and overgrown with climbing plants, but there is a strong tower of a more military character, built by the fourth Earl of Northumberland, in 1488, and repaired by the first Duke,



GROUND PLAN
OF
HULNE ABBEY

Surveyed April. 1817.

by

ROBT TATE.

Scale of Feet.

10 20 30 40 50 60 70 80 90 100 150 200 Feet

in 1764, which is in good preservation. Ascending this, the ruins are seen to advantage. Taking the cloisters as a central feature, the decayed walls of the church, out of which gnarled trunks of trees are growing, may be traced on the north; the refectory and the kitchen to the east; the chapter house to the west; to the south are the remains of the various offices, and of a large building which may have been a chapel. The dormitories are supposed to have been placed over the arcades of the cloisters. The ruins basked in the sun, in a landscape a-glow with green, over which the crest of firs on Brislee Mount fluttered pensively.

Several members made the ascent of Brislee Tower, whence a delightful prospect of the Cheviot country, the valley of the Alne, with the meanderings of the silvery stream, the deer parks, the castles of Alnwick, Dunstanborough, and Bamborough, and the glittering island-dotted ocean, was obtained.

At the Forest Gate the party lingered before another attraction of a different character—an ancient cist, which the Duke had allowed to remain untouched, for the inspection of the Clubs; an urn which was found in it, and is now preserved in the Castle Museum, proves it to have belonged to the latter part of the Celtic period. As they returned, Mr. Wilson pointed out the quarry from whence 60,000 tons of stone have been hewn, for the new works at the castle.

The other section led by Mr. Holme, and Mr. Tate, took the route to Ratcheugh, and had the benefit of the geological knowledge of the latter gentleman. He pointed out the two distinct beds of whin still, between which, limestones and shales are intercalated. The great Basaltic Crag, on which the tower stands, is 70 or 80 feet in thickness, and slopes to the south-east, but towards the south of the section it dwindles down to a thickness of a few feet, showing that it is not a continuous stratum, but a wedge shaped mass, intruded among the mountain limestone beds; in confirmation of which, we find the underlying shales converted by the heat of the intruded mass, into porcelain jaspers, and the overlying limestone, into crystalline marble.

From the top of the crag, Mr. Tate pointed out the range of the basalt through the country, from Kyloe on the north, to Glenwhelt on the south, showing that its relative position among the limestone strata is not the same throughout its range, in one part a well recognised limestone sill, being immediately above it, and in others many fathoms below it.

All were re-united at dinner, at which the insufficient provision and defective arrangements caused much confusion. Mr. D. Milne Holme, President of the Berwickshire Naturalists' Club, took the chair and our late President, Dr. Johnson, the vice-chair.

When the cloth was removed, Mr. Holme congratulated the members of both Clubs, on the success of the re-union of two societies whose objects and pursuits are identical. Dr. Johnson having replied on behalf of our Club, the following papers were read by Mr. Mennell.

I.—On the Influence of external circumstances on the Growth of a Sea-weed, *Callithamnion Rothii*, by Mr. George S. Brady.

II.—On a Curious Instinct of the Wasp, by Mr. T. J. Bold.

Both have since been printed.

The Rev. Mr. Clark, of Belford, mentioned having observed a similar occurrence to that described by Mr. Bold.

Mr. George Tate, F.G.S., Secretary of the Berwickshire Club, then read his paper "On the Remains of a Celtic Town on Greaves Ash, near Linhope," with the results of the excavations recently made there. The fact of many of our members having visited these ruins on the occasion of our great Cheviot meeting, made it additionally interesting. This valuable contribution to our knowledge of a remote and obscure period of our history, has just appeared in the Proceedings of the Berwickshire Club, Vol. IV. p. 293, and is illustrated with a number of excellent plates. We can only give a bare outline of it here.

The whole valley of the Breamish seems to have contained a numerous population in ancient British times, for the hills there are covered with forts and the remains of dwellings. The most remarkable of them is that on Greaves Ash. It was, indeed, a fortified town, with defences of great walls, from 5 to 12 feet in thickness, indicating military skill. Circular dwellings, in

groups, were within these ramparts. The gateway, which was strongly defended, is on the east, and the entrances to the dwellings are in the same direction, partly it may be, for shelter from the high westerly winds; but, as the arrangement is general over the country, it may have also partly originated in some superstition connected with sun worship. The huts were circular, usually about 20 feet in diameter; they were partly flagged in a rude manner with flat porphyry stones, and partly paved; the entrance had a door, probably of wood or wicker work, for there is a row of flags laid across the entrance, about four inches higher than the level of the floor, as if to check a door. The fire had been in the centre. There had been a wall probably about five or six feet high, for portions still remain from two to three feet in height, and on this the wooden rafters had rested, which had been covered with wicker work and with reeds, straw, or sods. In one hut, against the rampart, the fire had been in a hollow of eighteen inches below the surface, and the smoke had escaped by a rude flue through the wall. A large number of these hut arches are traceable. The walls of the ramparts and huts are constructed of large blocks of porphyry, without lime or cement of any kind. In this singular town, and at the Chesters and Brough Law, two other camps of a similar age, during the excavations made by the Club, assisted by the munificent liberality of the Duke of Northumberland, there have been discovered coarse pottery of a Celtic character, flint weapons, a glass amulet and armlet, deers' horns, horses' teeth and bones, and several querns or stone handmills. Curiously enough, one of these querns, after having ground the corn of the primitive Britons, was at last applied by them as a flag in one of the huts. At Greaves Ash Town there appears no reconstruction in a changed style—no relics to show even temporary occupation after the race who founded it had perished—no trace of the Roman Conqueror, nor even the influence of Roman ideas in the construction of the works. This ruined town therefore remains an imperfect, but nevertheless unalloyed, relic of one of the earliest of British races. It differed much from our modern notions of a town; there were no rows of rectangular houses, with windows

and chimneys—no regular streets nor alleys; there were but simple circular huts with indistinct trackways between them. Of rude structure, yet of massive strength, it was not hastily raised for a temporary purpose, but as a place of residence to last for ages; and these massive remains are now in their ruined state, instructive memorials of a people who long ago passed away, and of whom we have few records. Peace and security now reign in the valley of the Breamish; but in the old Celtic times the hill tops bristled with fortresses, and breathed distrust and strife; and these arrangements tell of a divided state of society, and of separate tribes and clans often at war with each other.

After Dr. Bruce, Mr. Murray, Mr. Holme and other gentlemen had remarked on this paper, the Rev. Henry Parker, of Ilderton, brought before the meeting a silver cross, with an inscription supposed to be A C C A, or A G L A, in Saxon characters of the eighth century.

An account of the Mussel and Oyster Beds, which the Duke of Northumberland is forming at Alnmouth, for the benefit of the fishermen there, was given by Mr. Williamson, who has had charge of their construction.

Mr. Boyd, of Hetton, communicated the discovery of plants and insects new to the immediate locality.

Sixteen members were added to the Tyneside Club. After which the meeting broke up, with mutual good wishes for each other's continued prosperity and usefulness.

In the Proceedings of the Berwickshire Club, vol. IV., p. 219, will be found an excellent account of this meeting, by the President, D. Milne Holme, Esq.

The Fifth Field Meeting was held at Staward or Staworth Peel, on Tuesday, the 24th September.

Owing in a great measure to the furious western gale which prevailed the day before, and which was accompanied by a deluge of rain, fewer members than usual assembled at the hour of departure. The weather still looked threatening, the atmosphere was heavy and humid, and a slight hoar frost did not add much to the prospective comfort of the day, but before the train had gone far occasional gleams of sunshine stole into the carriage windows,

and when we halted at Haydon Bridge, the weather was all that could be desired. At the Anchor Hotel, the party, augmented by others who had gone over night, breakfasted, and at nine o'clock commenced the day's excursion.

Although the sun had entirely dispersed the threatening clouds of the early morning, underfoot the state of things was less agreeable. After a brisk walk, varied by occasional pauses to admire the beauties of the scenery, Langley Castle was reached, where the first grand halt was made. The fine old ruin was carefully examined, its walls are in a tolerably good state of preservation, and some part of it is inhabitated, the occupants of which showed the visitors every attention. Situated on a gentle eminence, it commands good views of the Tyne valley, and the surrounding country. It originally belonged to the Barons of Tynedale, but in the reign of Henry III. it passed to the Lucies, and thence to the Percies, by whom, being probably to them of minor importance, it was like many other castles which came into their possession, suffered to fall into decay. Thence wandering across the common, which is undergoing a thorough course of draining, the party lamented that spots like these, dear to the naturalist, should be everywhere doomed to destruction in this highly cultivating, draining age. In a little time, no bog will remain, the very rush will have a hard "struggle for existence," numberless plants and animals, now common, will become extinct, and many birds will have to seek fresh haunts in which to rear their young. Leaving Langley Mills on the left, and forsaking the high road for a field path, the party soon reached the wood in which all that remains of the fortress of Staward Peel now stands. Still, though little more than a column of masonry remains, the place will well repay a visit; never was better site for a mediæval fortress chosen, standing out on a rocky peninsula, the two sides of which, at their bases, are washed by impetuous streams, it could only be approached by a narrow neck of land, which a handful of men might effectually guard. The scenery around, although of limited extent, is very fine. The precipitous banks which rise from the Allen and the Harestandene Burn, are richly clothed with trees. The two streams meet together immediately below the Peel, and

their beds are full of rocks, among which the waters fret and dash themselves unceasingly.* In descending to the river Allen, the party divided, one section followed its course to its junction with the Tyne, and crossing that river near Ridley Hall, returned leisurely to Haydon Bridge. The others retraced their steps to the lead mines they had previously passed, where they were met by Mr. Dinning, the proprietor, who showed them over the works, and explained to them the various processes of dressing and smelting the ore. After partaking of some refreshment, hospitably provided by Mr. Dinning, these also came to an "Anchor" at Haydon Bridge, where, after dinner had been discussed, Mr. Perkins read the following papers.

I.—On the Occurrence of a Goat-sucker *(Caprimulgus rufi-collis)*, new to Great Britain, by Mr. John Hancock.

II.—On the Luminosity of the Larva of the Glow-worm, by Mr. V. R. Perkins.

Both have since been printed.

The President then distributed a number of beautiful specimens of the "skimmings" of lead, presented by Mr. Dinning. Six new members were elected, and the thanks of those present having been accorded to Mr. Dinning, the day's proceedings were brought to a termination.

The Sixth and Last Field Meeting was held, as usual, at Marsden, on Friday, the 18th October.

This year the route selected was by South Shields, where the party mustered on the South Pier about one o'clock. Many members unable to steal a whole day from their professions or business, gladly avail themselves of this half-holiday, and a fine day combined with this to swell the attendance.

Mr. Philip Messent, C.E., Resident Engineer to the Tyne Commissioners, kindly met the party at the Pier, and explained to them the construction, future direction, and probable effects of the works, on the harbour and bar, and he has since obligingly furnished us with a short summary of his remarks.

* Some further particulars respecting the early history of the fortress will be found in Mr. Hogg's Address, vol. III., p. 182.

On the Tyne Piers. By PHILIP MESSENT, Esq., C.E.

The Tyne Piers now in progress of construction, are two stone piers or breakwaters, one on either side of the entrance to the Tyne. They commence at the shore above high water line, and are intended to terminate in a depth of 30 feet at low water, or 45 feet at high water; the outer ends projecting seaward about 2,000 feet beyond the most prominent portion of the cliff at Tynemouth, from which the north pier starts, and 1,500 feet beyond the present bar. The opening, or space between the pier ends, is proposed to be 1,100 feet wide.

The points from which the two piers start, are rather more than 5,000 feet apart, they therefore converge as they advance outwards. The total length of the north pier, when finished, will be 3,000 feet, that of the south pier, 5,400 feet. They are both to project to the same distance beyond the general coast line, and the extra length of the south pier is due to its starting-point being much further within the general coast line than the starting-point of the north pier.

The North Pier is formed of a base of rubble stone, or "pierre perdue," deposited by barges to near the level of low water, upon which is erected a stone pier or wall nearly 50 feet wide at the base, the faces of which are of solid masonry, enclosing a hearting of rubble. The north face of the wall is carried up to a height of 24 feet above high water, spring tide level, and is finished with a coping, which forms the parapet of the upper of the two roads, or ways, into which the top of the pier is divided. This upper platform, called the promenade, is 13 feet wide, and 20 feet above high water level. The south, or inner facing of the pier is raised to 10 feet above high water, at which level the lower road, or quay, 18 feet wide is formed, which affords in rough weather, a way sheltered from the N. and N.E. gales. Additional shelter is also provided by alcoves under the promenade, at intervals of 50 feet.

Of this work, 1,250 feet have been completed to the finished height, and the foundation has been prepared for a further 200 feet.

The South Pier has a base of rubble stone similar to the north pier, but the superstructure above low water consists of an embankment, or hearting of rubble, with sloping sides, faced with large stones, cut and fitted together without mortar or cement; the top forming a road or way 27 feet wide, is 10 feet above high water, and is to be furnished with a parapet on the south side. Of this work 2,400 feet have been raised to the full height, and the foundation prepared for 400 feet more.

The object of the works which I have described, is to improve the entrance to the river Tyne by giving increased depth, smoother water, and shelter for ships entering in stormy weather. The shelter is partially accomplished already by the north pier, the finished portion of which, now protects the bar from northerly gales, and so, considerably reduces the danger of loss of life from shipwrecks. The other objects are not expected to be obtained to any great extent, until the works are further advanced, especially the south pier, the outer end of which is still about 100 feet behind that of the north pier, compared with the general coast line, although it is to be even with the north pier when finished. This continued difference, or present backwardness, on the part of the south pier, is on account of the Admiralty, who have the control of all such works, having limited the length of the south pier to the 2,800 feet at first contracted for, and now nearly executed. The works are being carried out upon the design of Mr. James Walker, F.R.S. The contractor for the portions now nearly completed, is Mr. Lawton.

Thence the party wandered along the shore to the Trow Rocks, where Mr. Howse was, as usual, in great request, his annual geological expositions being now looked upon as a most attractive and necessary part of the programme. In his labours he was ably aided by Mr. J. W. Kirkby, who, with equal readiness and good-will, imparted the knowledge of which years of patient research have made him master.

The Trow Rocks are fast vanishing before the dire assaults of the quarrymen, the visits of the Club find them growing,

year by year, small by degrees, but we cannot add, beautifully less. Nevertheless, the blastings expose in the course of destruction, many instructive and beautiful sections.

The whole coast from this point is fraught with beauty, the numberless little bays, and the varied contour of the cliffs and rocks, form a constant succession of pictures. Frenchman's Bay, Manhaven, and other familiar names will bring up before the minds of many, pleasant recollections.

Then came Marsden and all its attractions, so often descanted on in former addresses.

Here all, and how many that was, we fear to guess, sat down to tea in Peter Allen's great ball-room, not decked with the adornments a stranger would expect from its name, but hewn out of the solid and living limestone rock.

The business of the evening was commenced by the election of fourteen new members, which led naturally to a discussion on a subject of vital importance to the Club, but one very difficult to deal with, namely the restriction of its numbers; many have feared that the Club was outgrowing its strength, and that its scientific element might be swamped by the merely pleasure seeking one. That this fear is an imaginary one, we are convinced, and although the great increase of members undoubtedly entails increased responsibility and labour on your officers, we doubt the policy of any society quarrelling with its own prosperity. That some regulations to meet the emergency, may be desirable, we do not doubt, and leave to this anniversary meeting their discussion and consideration, trusting that whatever decision is arrived at, may be conducive to the real interests and continued usefulness of the Club. Our respected ex-president, Mr. Ingham, M.P. for South Shields, who was present, expressed a hope that nothing would be done to render the Society in any way exclusive, or to confine it more strictly than at present to purely scientific men, a hope in which we cordially unite.

After much friendly discussion on the subject, in which our late President, Mr. Abbes, Mr. Ingham, and others took part, the meeting passed to other business.

The following short papers were read by Mr. Mennell, viz:—

I.—Algological Notes, by George S. Brady.

II.—Botanical Notes, by John Hogg, Esq., M.A., F.R.S., &c.

The President then read a very brilliant and entertaining paper entitled "Obituary Notices of a Toad, found in the Limestone Rock at Bishopwearmouth." The members will recollect that this animal occupied much of the attention of the last Marsden meeting, and in his paper, Dr. Johnson reviewed the history of the case, and related how grievously, in many ways, the reptile had disappointed its friends and admirers. For instance, it had turned out to be a frog, (frogs we believe, are never even *said* to be immured for countless ages in solid rock). It had opened its mouth and eat, (it will be remembered that when first introduced to our notice, it had *no mouth*, the want of use for that organ having on Darwinian principles obliterated it), so that feature, or (as Mr. Robson pointed out), more correctly, that absence of a feature no longer existed. It had not only eaten, but had eaten with avidity, and evident recognition, a common house fly of the present day, and not a fossil Permian fly, the digestibility of which it ought alone to have been acquainted with.

Mr. E. C. Robson followed in an amusing speech on the probable reflections and cogitations of the animal during its long imprisonment, and the motives which led it to seek retirement and seclusion.

In this case, as in all others of a like character, careful sifting of the particulars detects flaws in the evidence, or exposes the incorrectness of the story.

An adjournment to the caves, which were lighted up with bonfires, followed, and then a moonlight walk homewards closed the day's enjoyment, and with it, the out-door campaign of the year.

The indoor gatherings commenced with an Evening Meeting held in Newcastle, on Thursday, the 6th December, 1861.

About fifty members, and a number of ladies were present, and the President occupied the Chair.

The papers read, were as follows.

I.—On the Effects of the Severe Winter of 1860-61 on Evergreen Vegetation, by Ralph Carr, Esq.

II.—Notes on the same subject, communicated to Mr. Carr, by Sir Charles Monck, Bart.

III.—On the Popular Superstitions and Folk Lore of the neighbourhood of Stamfordham, by the Rev. J. F. Bigge, M.A.

All these papers were fully discussed, and much additional and valuable information elicited; they have since been printed, so that no summary of them is necessary here.

With regard to Mr. Carr's paper, we may, however, say that its contents may be usefully studied in connection with a paper by that gentleman, in our "Transactions," vol. III. p. 58.

In the recent number of the Transactions of the Edinburgh Botanical Society, there are also some valuable papers on the same subject.

The thermometrical record of the severe frost of the winter 1860-1, appended to Sir Charles Monck's notes, will be found of great value for future comparison.

An interesting discussion followed, on the proper placing of meteorological instruments for securing uniform observations.

It was resolved on the motion of the Rev. J. F. Bigge, that short and clear instructions should be prepared by the Club, and that the gentlemen who furnish observations, should form a sub-committee for the purpose.

A recently trapped specimen of the white variety of the Mole, was exhibited by Mr. Thomas Thompson, of Winlaton.

This was the last occasion at which our President appeared among us, a week after he was no more.

The Second Evening Meeting was held on Monday, the 23rd December, 1861.

Dr. Charlton presided, and there was a considerable attendance of members.

Before proceeding with the business, Dr. Charlton alluded in feeling terms to the death of the President, and a resolution embodying the substance of his remarks, was ordered to be entered on the minutes, and a copy of it sent by the secretaries, to the family of the late Dr. Johnson.

Three gentlemen were then elected members of the Club, and the papers were proceeded with :—

I.—On the Fossil Remains of Mammalia, found in the counties of Northumberland and Durham, by Mr. Richard Howse; read by the author, who illustrated his subject by a magnificent series of specimens of horns and bones of many of the animals he noticed; of these, the horns of the True Elk, or Moose, and those of the Great Irish Elk, excited special attentions.

On a recent visit to Newcastle, Professor Owen stated that the former were the first and only proofs, he had seen of the occurrence of the Moose in the fossiliferous deposits of England.

II.—Analysis and Description of specimens of Magnesian Limestone from the Trow Rocks, by Mr. Robert C. Clapham.

A large series of observations of this description, would doubtless be found of the greatest utility to geologists in assisting them to explain the physical characters of rocks, and to indentify the various members of a series, and we trust that these observations will shortly be furnished by Mr. Browell and Mr. Clapham.

III.—On the Preservation and Acclimatisation of Animals, by Mr. William Green, jun.

For these papers, we may refer the members to the last part of the Transactions.

The Third Evening Meeting was held on Thursday, the 19th January, 1862.

The attendance was large, and the chair was occupied by Dr. Charlton, who, after a few preliminary remarks, called upon the Rev. H. B. Tristram to present to Mr. H. T. Mennell, on behalf of the Testimonial Committee, the valuable microscope, which had been purchased by them for the purpose.

Mr. Tristram said, he rose that evening with very different feelings from those with which he anticipated he should have had the pleasure of joining, not taking the lead, but taking a more humble part in the presentation of that testimonial to their secretary. That was the first evening meeting they had had since the presidential chair was vacant; and ably as it was filled by their senior vice-president, they could not but feel deeply the loss of Dr. Johnson, with whom very many of them had become acquainted through the medium of the club. His acquaintance with Dr. Johnson began, like that of a number of other members,

on their three days' excursion to the Cheviots—one of their expeditions on which many of them would always look back as one of the most delightful excursions in which they had ever taken part. But whilst feeling thus, he must hasten to the business to which their chairman had called him, which was to express on their behalf their feelings towards Mr. Mennell, in presenting him with that testimonial. There was, perhaps, no pursuit in life which was so productive of friendly feelings, which so bound men in pleasant associations and intercourse, which so rapidly ripened into friendship, as did that of natural history. Next to the great universal bond of a common Saviour, he knew of no bond which bound men so closely together as that of a common love of nature. They knew very well that there were other labours which bound men together. Men of the same habits, profession, and business had much in common; but how very often did they find that those whose profession or business was the same, were very glad to leave each other behind when they left the desk, the office, or the counting-house. It was not so, however, with the love of natural history. They were glad to seize upon the opportunity of investigating the truths of nature; and those who joined them in doing so, were certainly drawn to them by the most unselfish of earthly friendships. The friendships which were then formed were deeper than the mere superficial friendships of ordinary society, as he had had the opportunity of knowing from his acquaintance with foreign naturalists. If the society had not accomplished anything more than uniting them together, through their love of natural history, it had still been eminently successful. It had brought the country naturalists into communication with the naturalists of the closet and the study; and had afforded them the advantage of the intellectualism of such men as Drs. Charlton and Embleton, and other members whom he saw around. If they had not the volumes of published transactions which had already taken their place amongst the natural history works of reference in the country, to refer to, as proofs of their having been a useful society, he thought that that even was sufficient. He had thus shewn that the Tyneside Club had succeeded as a bond of friendship; he need not refer to its being a scientific

club; but he must tell them that he considered it most thoroughly and decidedly a political club. He conceived that they united the broadest republicanism, with the staunchest conservatism. They were conservative in their love of nature, and their reverence for it; whilst, in their own meetings, they were entirely republican. And if their club had succeeded, he asked them to whom did they owe it? To whom did they owe that and many other evening gatherings? To whom did they owe their successful excursions? It did not require them to go back many years to arrive at the time when a microscope was needed to detect the members of the Tyneside Naturalists' Field Club while upon one of those excusions. To whom did they owe those holidays which they all sought and studied to enjoy? To whom did they owe those pleasant meetings which began in the merry month of May, when so many of them met together at the Central Station, for the purpose of visiting different parts of the country? They were now a complete army in numbers, upon those occasions; but they had in their secretary, Mr. Mennell, a gentleman who was a wonderful commissariat officer, an admirable adjutant-general, a master of the quarter-master general's place, and one who certainly deserved to be in the chair of a railway company, for his land transport arrangements. All the enjoyments he had enumerated they owed, more than to any other man, to their senior secretary, Mr. Mennell. Therefore, he presented that testimonial, as a slight expression of esteem, in the name of the club, to Mr. Mennell for his acceptance, in the assurance that they had been for years perfectly cognizant of his value to them; for had it not been for his own modesty, they would, long ago, have done that which they now did. They knew that the club had been successful from the moment that Mr. Mennell had undertaken the secretaryship; and that success was due to Mr. Mennell, and not to himself and other gentlemen, who acted in the ornamental capacity of chairmen. He concluded by presenting the testimonial to Mr. Mennell, and expressing a hope that he would long live to possess that microscope, and to study the world within worlds which it revealed.

Mr. Mennell, in responding, begged them to excuse his own

lack of the gift of public speaking, which he had never possessed. Before he replied to the observations which Mr. Tristram had addressed to him, let him refer to the services of others whom they seemed almost to have forgotten. He particularly alluded to the services of his predecessor in the secretaryship, Mr. Daniel Oliver, now professor of botany at University College. That gentleman had taken the office of secretary when the affairs of the club were in a very different condition to that they were in now; and although he was not, perhaps, so often seen in the field, as he (Mr. Mennell) had been, yet, by his exertions and energy, the affairs of the club were put into good working order. Mr. Oliver, too, was what he regretted to say he himself was not—a really sound and thorough naturalist in his own department. The "Transactions" were enriched by his contributions, and since he left them, he had won honour both for himself and for them in his own department. Mr. Tristram had also alluded to the presidents and vice-presidents, as if they were merely ornamental officers. Since the time he became secretary, however, he was sure he had not seen any presidents of that description. When he took the office of secretary, Mr. Kell was their president; and he was sure that they all deeply regretted that very serious illness had prevented him from taking part in their proceedings for some time past; but he had neither spared pains nor trouble in furthering the interests of the club; and it was chiefly through his exertions that its financial condition was brought to a state of order. And they all knew how much they were indebted to Mr. Tristram as president. He was always found, during his year of office, at the head of their Border forays and peaceful raids, cheering them by his example and precept. Their late president had also assisted him greatly by the warm interest which he took in the success of the society. He must not omit to mention that he had, during the past year, been assisted by an excellent and hard-working colleague (Mr. Perkins), to whom at least half the credit of conducting the business of the club during the time belonged. With regard to himself, he was sure that he could not find words to express his heartfelt gratitude to all present, and to those who had taken such interest in that matter. He would always keep

the beautiful instrument with which they had presented him, to remind him of their kindness, and of his own duty to the club. He would, as long as he had the power, endeavour to serve it in every possible way to the best of his ability.

The papers announced in the programme, were then read by their authors.

I.—On the Development of *Phoxichilidum coccineum*, by Mr. George Hodge.

Several excellent microscopes were on the table, with the aid of which, a large number of beautiful preparations, illustrating the subject, were examined by those present, at the close of the paper.

During the examination, Mr. E. C. Robson read some humorous lines on the defunct toad *alias* frog.

RESPECTFULLY DEDICATED TO THE TYNESIDE NATURALISTS' FIELD CLUB.

Toad long pent in dreary hole,
What to thee was life's great goal?
What could be thy daily care
Exiled from this upper air?
How might ozone reach to thee
In sufficing quantity?
How did'st feed? how boil the pot,
Mewed within thy narrow grot?
Dids't thou pass thy hermit life
Free from trouble, care, and strife?
Much I fear, the *wisest* man,
Doomed to such a straightened span,
With his vain imaginings,
Would fret his soul to fiddle-strings!
Did'st thou there in silence brood
On the "bliss of solitude?"
Or dream of silver streams long gone,
Gilded by the summer's sun,
And mourn thy tadpoles far away,
"Young barbarians all at play?"
Or toad spouse swayed on weed or lily
"Trembling in the waters chilly,"
Heedless all that husband—dad
Was in his limestone jacket clad,
Fast blocked up in stony wall,
Palœontological!
Beer, tobacco, wine, and love—

All that moves this world above;
Peace or war, the price of stocks,
Railway shares, canals, or docks;
Kingdoms quaking overhead
Were to thee a letter dead.

Toad of mystic, stoic soul,
Cribbed within thy Permian hole,
Much I marvel at thy lot,
Buried in thy living grot!

Had the great break up of time
Roused thee from thy dreams sublime;
Or, (short of final crack of doom,)
Had'st thou but lived as long as Brougham,
Savans of some unborn age,
All bespectacled and sage,
Would have rubbed their sapient eyes;
Gaping on thee with surprise;
Thought thee old as Noah's flood,
Batrachian of an early brood
Born in Præhistoric term,
Like some ugly Pachyderm!
Oh! if we could shut up snug
Knave and fool, hum-drum, and—bug,
What a blessing that would be,
Coffined all alive, like thee!

II.—On the Flora of the South Durham Ballast Hills, by the Rev. A. M. Norman, M.A.

III.—On the varieties or species included in the Linnæan *Polygonum aviculare*, by the Rev. A. M. Norman, M.A.

Both these papers were illustrated by a large series of very beautifully dried specimens, including a complete set of the various forms of the *Polygonum aviculare* of Linnæus described as distinct species, by continental botanists.

Since the removal of Professor Oliver to Kew Gardens, botany has ceased to receive, at our hands, that attention to which it is entitled; Mr. Norman's valuable contributions are therefore peculiarly acceptable, and will we trust, be followed up by others, as well as lead more of our members to take up this branch of science; and the conversation which followed the reading of the paper, showed that many are competent to do so.

In responding to a vote of thanks for his services in the chair,

Dr. Charlton alluded to the pleasure it gave him, to have brought so vividly to his mind, the recollection of the time when he pursued his favourite study, natural history, often in concert with the late lamented Professor Edward Forbes, with more ardour than his professional engagements now permitted, and he referred also to the great strides which in many departments, our knowledge has made since that time.

Three new members were elected at this meeting.

We can scarcely conclude this account of the meetings of the Club, without some brief allusion to the very successful Microscopic Soireé, which was held in the Newcastle Museum, kindly granted by the Natural History Society, for the purpose, on the evening of the day of the last Anniversary Meeting, April 9th, 1861.

The programme, given below, will best show the varied and instructive entertainment provided, a result in a large degree due to the exertions of the Microscopic Committee, consisting of Mr. A. Hancock, Dr. Embleton, Mr. H. B. Brady, and the Secretaries. Dr. Embleton delivered a short address during the evening, on the various classes of objects exhibited.

Refreshments were dispensed in a most satisfactory manner by Mrs. Wright, the wife of the worthy keeper of the Museum, and the very large company were, we believe, thoroughly gratified with the evening's entertainment.

PROGRAMME.

1	Sections of Wood, and other Vegetable Tissues	Jos. Wright.
2	Living Freshwater Algæ (Volvox, &c.) ...	Thomas Atthey.
3	Living Marine Polyzoa	George Hodge.
4	Living Marine Zoophytes	James W. Dees.
5	Exotic Diatointaceæ (Wenham's Bioncular) ...	Dr. Donkin.
6	Animal and Vegetable Structures by Polarized Light	Dr. Charlton.
7	Micro-photographs	Dr. Charlton.
8	Entomological Preparations	I. N. Robinson.
9	Marine Algæ	T. S. Dodgson.
10	Pollen of Mallow, Hollyhocks, &c.	E. C. Robson.
11	Living Desmidiaceæ	J. Davidson.

12	Vegetable Tissues (Spiral, Dotted, and Scalariform)	Dr. Emmerson.
13	Injected Preparations illustrative of Human Physiology	Andrew Bolton.
14	Sections of Minerals by Polarized Light ...	Chas. Wilson.
15	Spontaneous Motion in Marine Algæ (Spirulina, Spermatozoids of Fucus nodosus)	Geo. S. Brady.
16	Ova of the Toad, &c. (Wenham's Binocular Arrangement)...	H. B. Brady.
17	Fossil and Recent Foraminifera	H. B. Brady.
18	Vegetable Structures (Raphidean Cells, &c.)	D. O. Brown.
19	Frutification of Ferns	Lieut. A. H. Hunt.
20	Insects parasitic on Plants	Capt. Perkins.
21	Diatomaceæ	G. W. Rendel.
22	Objects by Polarized Light	Capt. Noble.
23	Tongues of Mollusca	Albany Hancock.
24	Circulation of Blood in Reptiles...	Dr. Embleton.
25	Ciliary Motion in Animal Tissues	Dr. Embleton.
26	Freshwater Algæ (Batrachosperma)	H. T. Mennell.
27	Daphnia (living) and other Entomostraca, including many new species	Rev. A. M. Norman.
28	Living Rotifera, and undescribed Polyzoa ...	Rev. A. M. Norman.
29	Circulation of Blood in the Larvæ of Ephemera	A. F. Marreco.
30	Palate of Miliobatis (Polarized Light)	Henry Clark.
31	Transparent Injected Preparations illustrative of Comparative Anatomy	T. H. Gamlen.
32	Ditto. ditto.	Dr. Gibb.
33	Vorticella Rotifera (living)	John Brown.
34	Crystallized Salts (Polarized Light)	John Martin.
35	Insect Preparations	Chas. Bass.
36	Pigment Cells (Human Eye, Skin of Negro, Eel, &c.)	Thos. Pigg.
37	Diatomaceæ, &c., from Mediterranean Soundings	Capt. West.
38	Micro-photographs	Rev. Dr. Bruce.
39	Petals of Flowers	Robert Foster.
40	Sections of Shell (Pinna, Mussel, Terebratula, &c.)	T. J. Howson.
41	Micro-photographs	W. M. Wake.

Revolving Stereoscopes and Debusscopes ...	John Mawson.
Aquaria	T. Crossling.

The very rapid increase in the attention given to microscopical investigation during the past few years, has been, we feel convinced, in a large measure owing to these soirees, and the evening

meetings of the Club, at which every encouragement has been given to the illustration of papers by microscopical preparations.

During the past year, two parts of our "Transactions" have been published, containing a large number of valuable papers contributed, as it is satisfactory to observe, by a greater number of individuals than has ever been the case before. These papers have been illustrated also by an unusual number of plates, and though these entail considerable expense, the committee are persuaded that no more satisfactory, or more useful expenditure of the funds of the Society can be devised; and they confidently recommend to their successors a like liberality.

For future parts, the committee are happy to state that the materials, ready or in progress, are ample.

The preparation of local catalogues, one of the chief duties undertaken by the Club, is proceeding satisfactorily.

In our last parts, a Catalogue of the Fossil Mammalia of Northumberland and Durham, by Mr. Richard Howse, has appeared, as well as large and interesting supplements to the list of Local Coleoptera, by Mr. T. J. Bold, and of Marine Algæ, by Mr. George S. Brady.

The Rev. A. M. Norman's catalogue of the Crustacea, a work of great labour and research, is progressing rapidly, and in the course of his investigations in this branch of natural history, many species have occurred to him, hitherto undescribed, or new to Great Britain. Of these several have been described, and figured in the Annals of Natural History, for January, 1862, and those belonging to our district, in our "Transactions," vol. V., p. 143.

Mr. George S. Brady has undertaken to prepare a catalogue of the Freshwater Algæ of our counties.

The very important and much desired catalogue of our Birds, promised by Mr. John Hancock, has not been lost sight of although its preparation has been delayed longer than was anticipated.

Mr. H. T. Mennell, and Mr. V. R. Perkins are engaged on a catalogue of our Mammalia, for which they have already collected a large amount of interesting information.

Mr. H. B. Brady progresses with his catalogue of the Foraminifera; and we hope that Dr. Donkin will undertake that of the Diatomaceæ, for which he has such rich and ample materials.

The committee regret that the catalogue of Lepidoptera, so ably begun by Mr. George Wailes, has not made progress during the past year, they however hope, that this and other branches of Entomology, will receive attention during the ensuing one.

None of our members have yet been found willing to undertake the Flora of our district, the committee would gladly report that it had been otherwise, as they believe that such a publication would give an impetus to the botanical studies of our members.

Mr. Joshua Alder has ready for publication a supplement to his already rich and valuable catalogue of Zoophytes.

Mr. T. J. Bold promises further additions to the Coleoptera, and that gentleman and Mr. Perkins have collected a very large number of species of Hemiptera, of which order of insects they trust to be able before long, to furnish us with a catalogue.

It has long been a matter of surprise that no one has taken up the study of our Carboniferous Fossils, and especially the Flora of the Coal Measures,—since the great work of Lindley and Hutton, nothing has been done to extend our knowledge in this department. We are happy to be able to state that one branch, at any rate of the Fauna, namely the fishes of the coal measures has been undertaken by Mr. Thomas Atthey, and Mr. James W. Kirkby; the large number of interesting specimens obtained by these gentlemen, have been mentioned in former addresses; during the past year Mr. Atthey has very largely added to his collection, and among the rest, many specimens, larger and more perfect than any previously obtained. A little attention to the subject by other members has served to show that these fish remains are far from uncommon, and further investigation over a wider area would no doubt add greatly to our knowledge of their distribution.

The very interesting question of whether the Floras of different seams differ, and consequently whether seams can be distinguished by their plants, is receiving some attention from Mr. J. B. Simpson, of Ryton, and is well worthy of the study of others whose

residence in the colliery district gives them an opportunity of following it.

Mr. George Hodge continues his investigations into the Development of the Pynogonidæ, and has also added some new species to our list of the Echinodermata, on both subjects we hope for further contributions to our "Transactions."

Mr. Albany Hancock will shortly describe two curious internal parasites, found in Doris pilosa, Doto coronata, and other Nudibranchiate mollusca, probably allied to, but quite distinct from the Crustacean genus, Chondrocanthus.

The Rev. William Greenwell promises us a paper upon the Remains of man and other animals recently found in Heathery Burn Cave, near Stanhope; this will doubtless prove a very interesting contribution, the more so as ossiferous caverns are unusually scarce in our district.

In Meteorology we are satisfied much remains to be done, the cost of obtaining and printing a really comprehensive record of observations, has hitherto retarded our progress.

In this department, the committee have to acknowledge the ready assistance they have received from a large number of gentlemen, and especially from the Rev. J. F. Bigge, and Mr. George Clayton Atkinson, whose very valuable and complete observations have been placed at the service of the Club.

Having reviewed the work of the year, as specially connected with our own members, we may devote a few lines to topics bearing on our pursuits, which have occupied the public mind, and which are not without their interest to us.

The most important of these is the Preservation of Salmon, a question which has of late years forced itself on the attention of all interested in river-fisheries. A serious and earnest effort appears to be now making, in both counties, to carry out the provisions of a recent act of Parliament, and to enforce the powers it confers. Influential meetings have been held at various places to organise the necessary co-operation. On behalf of the Tyne and its tributaries, meetings were held at Hexham on the 1st October, and the 5th November, on both occasions presided over by W. B. Beaumont, Esq., M. P., more recently the Coquet and its sister streams have been cared for.

Watchers have been appointed, and a system of taxation to defray the cost has been agreed to. The magistrates seem everywhere disposed to exercise their powers in cases of the breach of the regulations of the Act of Parliament, so that we trust this noble denizen of our rivers will long be preserved to us, and that instead of diminishing, its rapid increase may date from these exertions.

It is clear that the impurities suffered to flow into the Tyne, and other rivers, however deleterious, have little to do with the great decrease in the number of salmon; stake nets on the coast, weirs on our rivers, seldom or never opened, fishing at improper times, and consequent destruction of the roe, these are the active and powerful causes of diminution, and if these can be stopped, improvement is certain.

The great outlay which the Colonial Government of Australia, are willing to incur, for the sake of peopling their rivers with this valuable fish, should convince us of the importance of aiding in the work of preservation whenever it lies in our power.

Few questions connected with Natural History have been more talked about during the past few months, than the incubation of its eggs by the Python, in the Gardens of the Zoological Society, in London.

The important scientific problem involved in the mazy coils of the serpent, is whether a cold blooded vertebrate animal has the power of increasing the heat of its body, and so assisting in the development of its eggs by incubation.

Much difference of opinion still exists, although the experiments of Mr. P. L. Sclater, seem to answer the question in the affirmative, as appears from the following letter

TO THE EDITOR OF THE TIMES.

Sir,—As great interest has been manifested by the public in the case of the python now incubating her eggs in this society's gardens, perhaps you would kindly allow me, in reply to numerous inquiries on this subject, to state summarily in your columns the result of experiments made on three different occasions on the temperature of the body of this animal as compared with that of

the male, which is in the same compartment in the reptile-house, and is subject to exactly the same external circumstances. The instruments have been provided expressly for the purpose by Messrs. Negretti and Zambra, whose well-known names are a sufficient guarantee for their accuracy:—

Date. 1862.		Female on her eggs.	Male in same den.	Difference.
Feb. 12	Surface of body ...	73° 0′ ...	70° 2′ ...	2° 8′
	Between the coils ...	18° 6′ ...	74° 8′ ...	2° 8′
Feb. 23	Surface of body ...	75° 4′ ...	71° 8′ ...	3° 6′
	Between the coils ...	83° 2′ ...	84° 0′ ...	6° 2′
March 2	Surface of body ...	84° 0′ ...	71° 6′ ...	12° 4′
	Between the coils ...	96° 9′ ...	76° 0′ ...	20° 0′

March 2.—The eggs with the bulb of the Thermometer inserted, 94° 7′

I should mention that these experiments have been made by Mr. A. D. Bartlett, the Superintendent of the Society's Gardens, Mr. Negretti, Mr. Zambra, and myself.

It appears to me that these results, giving as they do a difference varying from 6° 8′ to 20° (of Fahrenheit's scale) in temperature in favour of the incubating female, prove conclusively the truth of M. Valencienne's views, as founded on the similar case which occurred in the Jardin des Plantes of Paris in 1841, and show that in the case of this cold-blooded vertebrate the heat of the female's body is abnormally increased during the process of incubation.

I may add that one of the eggs, which opened on the 15th day of incubation, contained a living embryo python about five inches in length, which is now before me.

I am, Sir, yours obediently,

P. L. SCLATER, Secretary to the Zoological Society of London.

11, Hanover Square, W., March 5.

Unfortunately the doubt has not been cleared up, for since this was written, the eggs have all proved "addled."

Allusion may here be appropriately made to the great prosperity which is attending other societies of a similar nature to our own. It is most gratifying to this Club to observe the success which attends those societies in other localities, which spring up year

after year, with kindred objects, and guided by very similar rules and regulations to our own. The Naturalists' Clubs of Liverpool and Manchester may be mentioned, as striking examples of activity and usefulness. Their tendency has been more to popular science and less to original investigation than ours, but to the latter, the former will probably lead them ere long.

The financial affairs of the Club continue to prosper. The receipts from subscriptions are considerably larger than in any former year. Nevertheless the expenditure on "circulars," and other items, which leave no permanent result, shows a large increase, an increase which must naturally follow from our growing numbers, and which however unsatisfactory, will continue to augment itself.

The amount spent on Transactions and Illustrations, is the best proof of the vitality and real usefulness of the Club, and so long as it is judiciously expended, its increase can only be hailed with pleasure.

The other items in the Treasurer's statement require no explanation, except that as regards the balance in the hands of the Treasurer, your committee seeing no reason for carrying forward and accumulating a large balance, have preferred to give to the members, in the course of the year, all that their annual subscription would admit of.

The roll of members now contains 451 names, being an increase of 75 during the year: 100 have been elected, and 25 have been removed by death or resignation.

The obituary, with the exception of the President, Dr. Johnson, contains the names of none who took an active part in the affairs of the Club.

Members elected since the last Anniversary Meeting.

At the Anniversary Meeting—Messrs. Thos. Mackay, M.D., Rev. J. Banning, Rev. W. Burnett, Newcastle; James Barron, Sunderland; Messrs. Thos. Young, Archibald Stevenson, J. H. Miller, South Shields; A. H. Hunt, Dr. Gibson, Birtley; W. H. Charlton, Esq., Hesleyside; John Booth, Solicitor, Durham.

At the Newburn Meeting—Messrs. James Hodgson, W. B. Sang, M.D., W. Barkas, T. Y. Hall, Newcastle; John Ramsay, Walbottle; John Legge, Houghton; Lindsay Wood, Hetton; T. Spencer, Lemington; G. H. Gooch, C.E., Lintz; Robert S. Watson, Bensham; Messrs. Cuthbert Young, Rev. Ynyr Bradshaw, South Shields; Messrs. D. A. Onslow, M. W. Buller, Blyth; John Abraham, Liverpool; John Halton, Carlisle; Francis Greenwell, Durham; and Thomas Sopwith, jun., Allenheads.

At the Seaham Meeting—Messrs. W. A. Mather, George Irving, J. A. Dawson, Newcastle; Messrs. C. H. Maling, Edward Pilkington, A. C. Logan, W. Tone, Sunderland; Edward Featherstonhaugh, Roker; Messrs. Robert Hewison, and Leonard Armstrong, South Shields.

At the Bellingham Meeting—Messrs. R. Thiedeman, J. R. Thompson, Thomas Prosser, Newcastle; Messrs. John Kidson, A. J. Moore, W. Harrison, Sunderland; Messrs. James Riddle, J. L. Browne, North Shields; Messrs. George Stout, George Stokoe, M.D., South Shields; Rev. A. Geake, Willington; and Rev. Thomas Emerson, Allendale.

At the Alnwick Meeting—Messrs. David Atkin, T. W. Hughes, C. M. Mowbray, M. Stobart, John Dixon, Rev. W. Newton, Mr. H. W. M. Vermehren, Newcastle; Messrs. W. S. Robinson, George Gowland, Thomas Crofton, Sunderland; —— Swinburne, Harton; Messrs. William Bainbridge, jun., Charles Anderson, R. B. Ridley, South Shields; Rev. H. Hicks, North Shields; H. Sidney, Morpeth; and H. S. Stobart, Witton.

At the Staward Peel Meeting—Messrs. Clement Lister, William Charlton, Newcastle; William Tate, Sunderland; Rev. James Mills, Robert Forth, North Shields; and Rev. Henry Robinson, Nent Head.

At the Marsden Meeting—Messrs. Joseph Anderson, Nath. Punshon, Newcastle; Messrs. J. O. Purves, Henry Dixon, Robert Taylor, Robert Buck, Henry Ritson, Arthur Robson, Charles Taylor, J. Williams, George Matthews, jun., C. H. Dodds, Samuel Alcock, jun., Sunderland; and Rev. Robert Green, Longhorsley.

At the First Evening Meeting—Messrs. W. W. Proctor, James Pyburn, Newcastle; Messrs. W. Kelsay, W. Dixon, Sunderland; and George Fenwick, North Shields.

At the Second Evening Meeting—Messrs. Alexander Fraser, Jonathan Cooke, Newcastle; and John Reay Sunderland.

At the Third Evening Meeting—Waynman Dixon, Newcastle; Joseph Spence, North Shields; John Shields, Durham.

At the Anniversary Meeting—It was unanimously resolved:

That the address which has been read, be adopted and printed.

That the Treasurer's account be received and printed.

That the following gentlemen be appointed office-bearers for 1862-3:—

President.

Rev. William Greenwell, M.A., &c.

Vice-Presidents.

Rev. H. B. Tristram, M.A., F.L.S., &c.
Edward Charlton, Esq., M.D.
Richard Howse, Esq.
Rev. Alfred Merle Norman, M.A.
Rev. George Cooper Abbes, M.A.
Dennis Embleton, Esq., M.D.

Treasurer.

Robert Y. Green.

Secretaries.

Henry T. Mennell, Vincent R. Perkins, } (General.)
George S. Brady, (Sunderland.)
Rev. W. T. Shields, (Hexham and North Tyne.)

Committee.

Rev. J. F. Bigge, M.A.
Joshua Alder.
Albany Hancock.
John Hancock.
John Thompson.
Joseph Blacklock.
Dr. Emmerson.
Henry B. Brady, F.L.S.
Robert Vint.
Dr. Donkin.
John Daglish.
Thomas Thompson.

That the days and places for the Field Meetings, be fixed as under, subject to the usual discretionary power of the Committee:—

Leamside and Durham,.....Thursday, May 29th.
Felton and Coquet side,.....Thursday, June 19th.
Hexham, St. Oswald's, and Chollerford, ...Friday, July 16th.
Beamish, Hedgehope, &c., Roddam, and Broughlaw,..... } Monday & Tuesday, August 18 & 19.
Ferry Hill, Morden Cars, and Hardwicke...Wed., Sept. 17th.
Marsden.....Friday, Oct 17th.

That all members elected after this date, shall pay an entrance fee of five shillings in addition to the annual subscription of five shillings.

That the Committee be authorized to contribute a sum not exceeding five pounds to the fund for dredging the Dogger Bank.

That in future the two senior Vice-presidents shall be ineligible for re-election, such ineligibility only to continue for one year, or until the next ensuing anniversary meeting.

That the thanks of the meeting are due, and are hereby given, to Dr. Charlton and the Rev. J. F. Bigge, for presiding over the meeting.

THE TREASURER IN ACCOUNT WITH THE TYNESIDE NATURALISTS' FIELD CLUB.

1861.	Dr.			
Feb. 1.—To Balance		£22	18	11
1862.				
Feb. 1.—To 401 Subscriptions, at 5s		100	5	0
To Sale of "Transactions" per Secretaries		4	16	6
To Balance of Microscopic Soiree, April 9, 1861		3	14	1
		£131	14	6

1862.	Cr.			
Feb. 1.—By M. & M. W. Lambert, Printing Vol. V. Pts. I. and II.		£53	12	11
Reprinting Vol. IV. Pt. II.		6	17	6
„ Tuffen West, Engraving		7	17	6
„ W. West, do.		7	0	0
„ J. G. Forster, Printing Circulars		34	19	4
„ W. Forrest, Commission on Collections, &c.		7	7	3
„ Postage, &c., per Secretaries.		5	0	1
„ Balance		8	19	11
		£131	14	6

Examined and allowed, HENRY TURNER, J. S. FORSTER, } Auditors.

XXX.—*Meteorological Report for* 1861. Edited by Henry T. Mennell.

The year 1861 will be gratefully remembered by the members of the Club, for the constancy with which it smiled upon their meetings; the summer and autumn contrasted most favourably with those of the previous year; on the east side of the island, the harvest was got in with unexampled rapidity, and in excellent condition; and tourists, both in this country and on the continent, will not soon forget the long succession of brilliant days, and the unbroken weather which attended them. The tables which accompany these remarks confirm the general impression which the year has left upon our minds. The rain-fall was about an average one, the mean-fall at 14 stations, being 26·96, or 7 inches less than that of 1860, on the other hand, it is 4½ inches more than that of 1858, the driest year in our record. The mean monthly fall at all our stations given this year for the first time, will be found of some utility, as the number and wide distribution of these stations, may, to a great degree, neutralise the effect of special and peculiar circumstances, affecting any of them.

The months of February and November were both exceptionally wet, and both these months and March were marked by storms most disastrous to shipping, of these the gales of February 8, (N.E.), March 6, (W.), May 17, and 20, (S.W.), and November 1, and 14, were peculiarly fatal; and the heavy rains caused a flood of very unusual height in the Tyne on the 20th November.

The record of the number of wet days does not yet prove itself of as great use as was anticipated, from the fact that different observers adopt different views as to what is to be called a wet day, and omit to enter days on which only showers, or thunderstorms occur: it was, and is, the intention and desire of the committee, that every day on which rain falls, should be entered under the "Rain" column. This is the only means by which uniformity of observation can be attained.

An unusually large number of interesting facts bearing on climate and seasons, have this year been communicated to us, and in order to encourage this kind of observation for the future

and to render them of greater value for comparison, tables have been drawn up, and distributed, on which the dates of the arrival and departure of migratory birds, the flowering of plants, the appearance of insects, and other facts of a similar character may be noted. Copies of this table may be had on application to the Secretaries.

Apart from the interest which attaches to this information, it is thought that by this means, habits of observation will be encouraged, and a larger number of our members led to study Nature in some one or other of its many branches. The very valuable series of observations contributed by Mr. Coppin, will furnish admirable data for comparison with the tables which will in future be contained in this report.

Stamfordham.—*Dates of the Flowering of Plants:*—Coltsfoot, February 26; Crocus, February 6; Celandine, March 9; Dog Violets, March 4; Cowslip, April 22; Cuckoo Flower, April 22. *Dates of the arrival of Birds:*—Chiff-chaff, April 22; Swallow, April 29; Redstart, May 2; Cuckoo, May 5. *Insects:*—Honey Bee, March 9; Queen Wasp, May 6; Orangetip, May 20. Fly-catchers were very numerous with us last year. The Garganey and Pochard were seen at Belsay in October. On November 18th the thermometer on the grass stood at 12° Fahr.—*Rev. John F. Bigge, Stamfordham.*

Seaham Harbour.—Spring wheat sown, March 15; Cuckoo, May 2, Swallow, May 3; Hawthorn, May 20; Wheat shot, June 15; Hay cut, June 19; Wheat cut, August 12.

On the 8th of May we had frost and snow; and on the 27th July, a very heavy thunder-storm, accompanied by a fall of large transparent, angular hailstones.—*George Hodge, Seaham Harbour.*

Wylam.—If the following record of the maximum and minimum thermometer, be compared with that for 1860, (vol. V., p. 29.) it will be seen that the mean temperature of 1861 was 3° higher than that of 1860, and was consequently slightly above the average.

	Min. Therm.	Max. Therm.	Mean.
January	29·5	42·1	35·3
February	33·4	29·1	41·2
March	35·4	50·3	42·8

	Min. Therm.		Max. Therm.		Mean.
April	36·9	...	53·0	...	44·9
May	42·4	...	59·6	...	51·0
June	49·5	...	66·2	...	57·8
July	49·3	...	67·5	...	58·4
August	52·5	...	69·2	...	61·0
September	45·6	...	62·0	...	53·8
October	42·0	...	59·0	...	50·5
November	32·6	...	47·2	...	39·9
December	31·8	...	44·5	...	38·0
	40·1	...	55·7	...	47·9

In glancing over the Barometer Diagram for 1861, it is unnecessary to point out how the heavy gales by which the months of February and November were characterised, were each accompanied by a remarkable fall of the mercury.

But it is much more curious and instructive to observe how the gradual downward tend of the barometer from the middle of April to the end of June, was followed by a considerable excess of rain in July ; and how the gradual upward tend from the latter end of July to the early part of September, was followed by the fine autumn which ensued.

There can be no doubt that the action of the barometer, as an indicator of weather likely to occur, should be observed on a broad and extended scale ; and to do this and comprehend its general action, the observer *must* have recourse to a diagram, to obtain at a glance a view of its action during considerable periods of time. Some months since, under the impression I have always held of the usefulness of this mode of representing the continuous action of the barometer, I gave the keeper of the barometer at Cullercoats, one of Reid's diagram books for the year ; but I think for the barometers on the coast, it might be well to keep the diagrams on a much larger scale, on a black board for instance, properly divided, and on a scale of three to one, or so. This might be long enough to contain a month's record, and might occupy the upper or under part of the window containing the barometer, and be filled in with chalk once or twice a day, by the person in charge of the barometer.

I feel confident that this mode of obtaining a comprehensive

view of the barometer over periods of several weeks, is the truly useful one.—*George C. Atkinson, Esq., Wylam Hall.*

Bishopwearmouth.—Fearful loss of life and property occasioned by a north-east gale, February 8, and 9; Lunar rainbows, September 13 and 26, and December 18; Meteor (seen also at Cambridge,) December 8.—*Rev. George Iliff, Field House.*

Cramlington.—A severe storm of wind and rain passed over this district, between Friday night and Sunday morning, Nov. 1, and 2.—*Thomas Atthey.*

Burradon.—*Dates of the Flowering of Plants*:—Cowslip, January 31; Mezereon, March 18; Wood Anemone, April, 4; Adoxa, April 27; Cuckooflower, April 27; Blackthorn, April 27; Hawthorn, May 26; Wild Rose, June 30. *Dates of the arrival of Birds*:—Wood Wren, April 27; Cuckoo, April 29. *Insects*:—White butterfly, April 29; May-fly and Cockchafer, May 24; Orangetip, May 26; Ghostmoth, June 20. Harvest Homes, September 9; Wheat sown, October 1. Hard frost, ice a quarter of an inch thick, wind N., November 27; Flood in the Tyne, higher than any since 1857.—*Thomas Robson.*

Newcastle-on-Tyne.—*Dates of the flowering of Plants*:—Cowslip, March 29 (not in their prime until May 15); Adoxa, Cuckooflower, Blackthorn, April 24; Wild Hyacinths, and Arum, May 1; Hawthorn, May 19. Wheat shot, and Hay cut June 20. The Chiff-chaff, Willow Wren, Wood Wren, and Grasshopper Warbler, were all heard in the woods on the Derwent, near Gibside, on the 24th April.—*H. T. Mennell.*

North Shields.—The following are the greatest daily falls of rain in each month, viz:—January 6, ·208; February 8, ·835; March 2, ·535; April 3, ·422; May 3, ·275; June 6, ·6; July 13, ·905; August 13, ·85; September 5, ·632; October 4, ·35; November 10, ·855; December 6, ·4.—*Robert Spence.*

From the above paragraphs, the following dates may be extracted for future comparison, and as they are confirmed by several observers, they may be safely depended upon for that purpose.

April 24 .....Cuckoo-flower, and Blackthorn.
Do. .....Chiff-chaff and Willow Wren.
April 29 .....Swallow and Cuckoo.
May 20..... .....Hawthorn, Orangetip.
June 15.....Hay cut.
August 12 .....Wheat cut.

It will be seen that we had our usual May snow-storm, on the 8th of that month; a fit of cold weather may be always counted upon in this month.

It will be remembered that during the drought of 1858, serious apprehensions were entertained that the supply of rain was permanently diminished, one of our members, Mr. J. Watson, combatted this opinion with much success, and the ample down-fall of 1860 may be said to have laid the ghost. We have, however, been favoured with a copy of observations, made at Kendal with great accuracy, and extending over a period of forty years, which may perhaps lead to a further consideration of the question. One great difficulty is to eliminate all those merely local influences, which may affect a particular district, and be unfelt beyond it. The observations at Kendal give the following results.

Average rain for a period of 10 years, 1822-31.....57 inches
„ „ „ 1832-41.....54 „
„ „ „ 1842-51.....50 „
„ „ „ 1852-61.....47 „
Average number of rainy days for the first 20 years.. 182
„ „ „ second 20 years.....169

The usual table of the number of days, on which certain winds prevailed at some of our stations, is given below. It does not present any unusual features.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
Seaham	28	37	16	13	44	96	85	29
Dunterley.....	24	43	48	40	13	24	141	27
Rothbury.....	1	50	55	41	3	105	99	23
Belford.....	9	37	16	31	44	95	86	29
Bishopwearmouth	2	61	4	64	5	141	8	79
Darlington	47	57	6	29	57	84	9	56

The following gentlemen have kindly furnished the data for the foregoing Report, viz:

ALLENHEADS ....Mr. Thos. J. Bewick, Lead Mines, Allenheads.
BYWELL ..... Ditto.
BELFORD .....Mr. W. J. Hindmarsh.
BISHOPWEARMOUTH .....Dr. Ogden.

Cramlington	Mr. Thomas Atthey.
Burradon	Mr. Thomas Robson.
Darlington	Edward Pease, Esq., Southend.
Dunterley, nr. Bellingham	Mr. John T. Dixon,
Durham	Mr. A. Marsh, Durham Observatory.
Howick Hall, the seat of Earl Grey	Communicated by the Rev. J. F. Bigge.
Lillurn Tower, near Alnwick, the seat of E. Collingwood, Esq.	Communicated by the Rev. J. F. Bigge.
Newcastle	Lieut. H. S. Sitwell, R.E.
North Shields	Mr. Robert Spence.
Roddam Hall, at the foot of the Cheviots, the seat of Wm. Roddam, Esq...	Communicated by the Rev. J. F. Bigge.
Rothbury	Mr. T. Graham.
Seaham Harbour	Mr. George Hodge.
Stamfordham	Rev. J. F. Bigge, Stamfordham Rectory.
Sunderland	Rev. George Iliff, Field House.
Wallsend	Mr. James W. Dees.
Washington	Mr. James Watson, F.R.A.S., Washington Chemical Works.
Whorlton, Teesdale	T. Dodgson, Esq., Stubb House, near Whorlton.
Wylam	G. C. Atkinson, Esq., Wylam Hall.

Place.	Darlington.		Whorlton.	Howick	Belford.		Rothbury		Roddam.	Lilburn.	Allenheads.		Dunterley, near Bellingham.		Stamfordham	Bywell.	
Elevation above sea.	135		450	120	510		280		510	..	1,360		401		380	87	
	Quantity.	Wind.	Quantity.	Quant.	W.	Wind.	W.	Wind.	Quant.	Quantity.	Quantity.	W.	W.	Wind.	Quant.	Quant.	W.
January	1·39	SW	·78	12in. snow not reduced.	16	SW, SE	19	SW, W	·73	1·145	1·261	19	17	W, NE	·62	1·27	19
February ...	6·28	SW	2· 1	·34	14	SW	23	SW	2·53	2·115	7·280	23	18	W,SW,NE	1·94	3·32	18
March.....	3·94	SW, NW	2·19	·86	17	SW, NW	27	SW, W, SE	2·77	1·705	5·148	29	23	W, E	1·58	2·34	18
April	1·43	NE	1·51	·66	12	W, SE	15	E,SE, NE	2·14	2·355	2·003	17	10	W, NE	1·75	1·41	10
May.....	0·65	NE, N	·34	·49	8	NE, SW	20	NE, W	1·11	1·220	1·435	20	13	W, NW, NE	1·67	·89	13
June	4·12	NE	1·93	1·54	16	SW	17	W, E	1·24	1·157	2·310	21	15	E, NE	2·51	3·59	16
July	2·68	SW,S, NW	3·30	1·83	19	SE, SW	26	W, SW, E	1·49	1·805	4·839	27	24	W, E	4·50	3·78	23
August	2·24	SW, NW	1·66	4·30	22	SW	23	SW, W	3·34	2·390	4·070	26	20	W	2·13	1·60	17
September ..	2·91	NW, S	2·83	2·20	17	SW	21	W, SW	2·97	4·215	5·220	26	19	W	3·51	2·88	21
October	1·28	SW,S	1·25	·85	9	SW, NW	16	SE, SW	1·98	·750	2·055	25	10	SE	1·44	1·39	18
November ..	3·66	SW,NW,N	5·11	3·43	27	SW, NE	28	W	3·86	5·345	10·693	28	21	W, NW	4·51	4·55	23
December ..	2·25	S,N	1·63	·77	7	NW, W	14	NE	2·31	1·815	3·040	21	11	W	1·06	1·28	17
Total, 1861..	32·83	SW.	24·54	..	184	SW	249	SW	26·27	26·170	49·354	282	201	W	26·22	23·80	213
Total, 1860..	31·86	..	30·28	27·48	235	SE, SW	273	W, SW	42·00	..	59·153	297	239	W, E, NW	35·26	38·00	259
Total, 1859..	27·65	..	26·74	18·84	147	NW, SW	200	W, NW, E	31·87	25·976	47·708	259	190	W, E	27·85	27·34	182
Total, 1858..	..	..	21·56	22·51	141	SW, W	183	W, NW, E	23·11	24·260	37·210	229	172	W, E	27·19	21·88	165
Total, 1857..	..	..	23·93	20·77	..	..	..	..	28·79	27·115	41·798	..	..	..	28·86	27·55	..
Total, 1856..	..	..	27·30	22·58	..	..	..	..	41·69	32·896	45·484	..	..	..	35·06	29·82	..

TEES. COQUET, CHEVIOT, &c. TYNE.

	Tyne.											Wear.						
Place.	Wylam.	Cramlington.	Burradon.		Newcastle.			North Shields		Wallsend.	Seaham Harbr.		Sunderland.			Durham.		Mean monthly Rain-fall at 14 stations.
Elevation above sea.	96	263	..		187			80		..	....		130			341		
	Quant.	W.	W.	Wind.	Quant.	W.	Wind.	Quant.	W.	Quantity.	W.	Wind.	Quant.	W.	Wind.	Quant.	W.	
January	·89	11	10	SW, NW	·60	13	S, W	1.002	20	1·590	14	SW.	·898	7	SE, SW	1·21	13	1·03
February ..	2·97	13	14	NE	2·88	19	S, SW	1·970	19	9·525	17	..	1·663	11	SW	2·56	16	3·30
March.....	1·84	24	14	W	1·55	24	W, SW	2·231	25	1·998	23	W, NW, SW	3·090	14	SW	1·83	14	2·36
April	1·17	11	11	NE, SE	1·05	18	N	1·252	19	1·430	14	E, NE	1 735	10	NE, SE	1·55	11	1·53
May	·71	16	7	NE, W	·60	19	W, N	1·424	21	·960	16	NE	·963	10	NE, NW	·72	10	0·94
June	2·17	17	12	NE, W	2·55	25	N, W	3·764	16	3 270	19	NE, SE	2·050	11	NE, SE	2·94	18	2·51
July	3·37	26	19	SW, S	2·88	28	S, SW	2·368	29	2·675	26	W, SW	3·790	9	SW	3·17	22	3·03
August	1·76	16	10	NW	1·50	19	W	1·671	23	1·635	13	W, SW	1·540	5	SW	1·37	14	2 23
September ..	2·63	20	12	NW	1·79	..	W	2·719	26	2·470	18	W, SW	2·260	18	SW, NW	2·50	21	2·94
October	1·23	8	6	..	·73	..	S	1·104	19	1·005	14	S, W	1·153	12	SW, SE	1·27	17	1·25
November ..	3·76	23	17	..	2·90	..	S, SW	4·361	28	4·070	21	N, W, S	4·195	17	SW, NE	4·01	18	4·60
December ...	1·04	12	10	SW, W	·55	..	S, W	·894	19	·921	12	W, SW	1·155	15	N, W, SW	1·15	17	1·42
Total, 1861..	23·54	197	142	..	19·58	..	..	24·760	264	24·619	207	SW, W	24·492	139	SW, NW	24·28	191	29·96
Total, 1860..	31·38	242	..	..	27·40	..	W	32·186	290	34·119	214	W, SW	24·71	145	..	30·33	..	34·16
Total, 1859..	25·15	170	..	..	18·41	..	W	..	171	23·515	171	SW, W	17·19	111	SW, NW, SE	21·57	..	26·14
Total, 1858..	18·20	156	..	..	13·29	..	W, SW	..	172	..	172	SW, W	17·87	119	SW, NW, SE	18·73	..	22·35
Total, 1857..	24·47	..	..	..	16·43	..	..	..	..	..	..	..	18·93	..	..	21·55	..	25·47
Total, 1856..	29·25	..	..	..	21·22	..	..	..	..	..	..	..	18·12	..	..	29·65	..	30·28

XXXI.—*Tables of the dates of the Flowering of Plants, the Arrival of Birds, &c.* By John Coppin, Esq.

1.—A list of wild plants growing within three miles of Tynemouth, with the days on which they first flowered, during the twelve years, from 1850 to 1861.

NAME.	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861
Tussilago farfara	Feb. 19	Feb. 15	..	Mar. 11	Feb. 24	..	Feb. 27	Feb. 23	..	..	..	Feb. 20
Ranunculus ficaria	March13	Mar. 14	..	Mar. 31	..	..	Mar. 22	Feb. 27	Mar. 18	Mar. 4	Mar. 26	Feb. 26
Lamium album	..	Mar. 5.	April 16	April 7	Mar. 22	April 23	Mar. 4	April 1	Mar. 29	Feb. 19	April 5	Mar. 1
Lamium purpureum	..	Mar. 27	April 2	April 5	Mar. 22	April 11	Mar. 5	Mar. 25	Mar. 24	Feb. 17	Mar. 19	Feb. 22
Glechoma hederacea.....	..	April 22	April 4	May 6	Mar. 21	..	April 10	..	Mar 25	Mar. 10	April 6	Mar. 30
Veronica hederifolia.....	March23	Mar. 12	Mar. 30	Mar. 30	Mar. 13	April 5	Mar. 12	April 7	Mar. 28	Mar. 4	April 5	Feb. 25
Veronica chamaedrys	May 1	May 1	May 6	May 22	April 21	May 29	..	May 20	May 19	May 3	May 11	April 25
Primula vulgaris	•	Mar. 20	..	April 6	Mar. 22	..	..	April 16	April 9	Mar. 17	April 25	Mar. 15
Primula veris.....	..	May 2	April 21	April 26	Mar. 23	..	April 15	..	..	April 18	May 3	April 11
Viola canina	..	April 9	April 16	April 26	..	April 23	April 15	..	April 21	April 1	April 24	April 11
Ribes grossularia	..	April 10	..	..	Mar. 16	..	Mar. 22	..	..	Mar. 13	April 17	Mar. 25
Prunus spinosus.....	..	..	..	..	..	..	..	May 14	May 1	Mar. 21	May 11	May 4
Cratœgus oxyacanthus	May 27	..	..	June 6	April 3	June 9	..	May 30	May 16	May 9	June 5	May 25
Trifolium pratensis	May 3	May 9	May 2	May 20	..	May 29	..	..	..	May 9	May 22	April 26
Ranunculus arvensis.....	..	May 3	May 2	April 26	..	..	..	..	..	May 9	May 12	May 1
Potentilla anserina	May 28	..	..	May 30	April 19	May 30	..	..	..	May 23	May 12	May 10
Rosa canina.....	..	..	..	..	..	July 9	..	..	..	June 15	June 28	June 24
1st Wheat shot	..	..	June 15	..	..	July 5	..	June 21	June 10	June 15	June 28	June 23
„ Barley shot	..	..	..	..	..	July 10	..	..	..	May 31	July 12	June 23
„ Oats shot	..	..	..	..	..	July 18	..	..	June 23	July 4	July 12	June 29
1st Wheat cut	..	Aug. 22	Aug. 19	Aug. 31	..	Aug. 28	Aug. 26	Aug. 22	Aug. 10	Aug. 5	Sept. 10	Aug. 6
„ Barley cut	..	..	..	Aug. 21	..	..	..	Aug. 24	..	..	Sept. 3	..
„ Oats cut	..	..	Aug. 20	Aug. 31	..	..	..	Aug. 24	..	..	Sept. 7	Aug. 12

2.—A list of the dates on which the following fruit-trees, shrubs, and plants, first flowered in a garden near North Shields, during the years 1851-1861.

NAME.	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861
Gooseberry	..	April 11	April 12	Mar. 17	April 21	April 8	April 15	April 9	Mar. 22	April 21	Mar. 24
Red Currant	..	April 13	..	Mar. 20	April 24	April 6	April 11	April 21	Mar. 24	April 26	Mar. 28
Pear Tree (Jargonelle)	April 11	April 12	May 2	April 2	May 4	April 25	April 22	April 20	Mar. 27	April 30	April 13
AppleTree(Keswick Codlg.)	April 14	April 14	May 11	April 5	April 21	May 1	May 17	May 1	April 5	May 7	April 22
Cherry Tree	April 2[illegible]	April 16	May 5	April 8	May 5	April 27	May 6	April 22	April 7	May 4	April 21
Yellow Crocus	..	March 5	Mar. 9	Feb. 23	Mar. 20	Feb. 27	Feb. 25	Mar. 14	Feb. 16	Mar. 7	Feb. 21
Purple Crocus	..	..	..	..	Mar. 24	Feb. 27	Feb. 27	Mar. 15	Feb. 26	Mar. 17	Mar. 2
White Crocus	..	March 5	..	..	Mar. 19	Feb. 27	Mar. 1	Mar. 16	Mar. 1	Mar. 14	Mar. 5
Yellow Auricula	..	April 8	April 19	Mar. 13	April 16	Mar. 29	April 9	April 15	Mar. 15	April 17	Mar. 24
Lilac Auricula	..	April 9	April 10	Mar. 12	April 15	March 4	Mar. 16	April 11	Mar. 15	April 8	Mar. 24
Blue Hyacinth	..	April 29	May 13	April 11	..	May 8	May 15	April 22	April 19	May 10	May 3
Lily of the Valley	..	May 13	May 30	..	June 4	May 29	May 28	May 21	May 17	May 22	May 16
Purple Lilac	..	..	..	..	June 10	..	May 25	..	May 15	May 26	May 20
Laburnum	..	..	..	..	June 10	..	June 3	May 27	May 20	May 29	..
Chrysanthemum	..	..	Nov. 19	..	Nov. 22	..	Nov. 9	..	..	..	Nov. 6
London Pride	..	May 15	..	..	June 4	..	..	..	May 8	May 24	May 10

3.—The days of the first appearance of the following Birds and Butterflies in this neighbourhood, during the years 1852-62.

NAME.	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861
Swallow	May 1	May 11	May 6	May 25	May 16	May 14	May 17	May 21	May 7	April 26
Cuckoo	..	..	..	..	May 26	May 19	May 1	May 9	May 1	May 12
Corncrake	..	..	..	May 25	May 20	May 25	May 28	..	..	..
Woodcock	..	..	..	..	..	..	Oct. 13	Oct. 10	Oct. 12	Sept. 19
Pontia Brassicæ	April 13	May 12	April 9	April 25	April 20	May 14	April 19	April 7	April 23	April 29
Vanessa Urticæ	..	..	Mar. 24	..	..	April 22	April 18	April 7	April 5	..

XXXII.—*Dates of the arrival of Birds, &c., in the neighbourhood of Durham, in the years* 1858-1861. By WILLIAM GREEN, jun.

NAME.	1858	1859	1860	1861
Primrose	..	March 16	..	April 4
Nest and eggs of Thrush	..	..	April 6	March 22
Swallow	April 23	April 21	May 1	April 24
Cuckoo	April 26	May 1	May 1	April 30
Swift	..	May 13	May 10	May 18
Hawthorn	June 6	June 3	..	June 1
Wild Rose	June 21	June 8	July 4	June 17
Wheat Shot	..	June 15	..	June 17
Hay Cut	June 28	July 4	June 28	..
Harvest General	August 11	August 19	*	August 20

* Very little corn led, October 3. A large quantity of corn still out, November 7.

XXXIII.—*Notes on some Peculiarities of Insect life in* 1861. By THOMAS JOHN BOLD.

NEVER perhaps were insects generally, so scarce as in 1861; the effects, without doubt, of the cold and wet summer of the previous year. Some remarkable exceptions to this, and one or two other peculiarities, I have thought worthy of record. Thus whilst bees, fossores, and saw-flies were so scarce, that they might be said not to be in existence at all, yet wasps were in such abundance, in some places, as to become a perfect pest. Everywhere in our own district, more than plenty of them were astir, and these were principally the ground wasps, *Vespa vulgaris*, and *V. rufa*. In the vicinity of Wigton, Cumberland, the wasps were abundant enough to dispute possession of the cherry crops with the owners, these also were the ground species. Near Brampton, and eastward by Lannercost, towards our own district one of the tree wasps, *Vespa norvegica*, was the predominant species. By the road-sides, leading from the railway station, to Naworth Castle, their nests might be noticed in especial abundance.

Near Lannercost, and up to the village of Banks, the same species had colonized the gardens, using the branches of the goose-berry bushes on which to suspend their nests. I was often asked to catch the hordes of "tartars" with my "fly-catcher," a task however which I "most respectfully" declined. One of the ground wasps would appear to have tenanted a fallow-field, at Walton-wood-head, and were so desperate in their attacks on horses and men, that the farmer had to cease work until the nests were sought out, and their inmates destroyed. Also very extraordinary was the occurrence of the common species of Apathus, (*A. campestris* and *barbutellus*,) in very nearly their usual numbers, whilst the species of Bombus, of which they are parasites, were in such diminished numbers, that certainly not more than one fiftieth part of the usual number of individuals of our commoner species (*muscorum pratorum*, *lucorum*, *lapidarius*, and *hortorum*) were noticed; of the rarer species (*senilis*, *fragrans*, *sylvarum*, *Derhamellus*, or *Scrim shiranus*) not a single specimen was seen during the whole season. The only species of solitary bee taken was *Megachile circumcinctus*, of which I caught a pair on the sands near South Shields, and these were only about one half the size of the specimens, from the same colony, which I took the previous year. During the whole season I only saw one Fossorial insect, *Crabro dimidiatus*, although I kept a sharp look out for them, the tribe being a great favourite of mine. Ants I think, also, were tolerably numerous, Mr. Perkins and I observed *Formica rufa* in great plenty, in the woods near Bothal, and I noticed *Formica nigra* in much of its usual numbers, when in Cumberland, in June. The commoner yellow ants were plentiful also, near the ballast heaps at South Shields. Earwigs were neither common nor destructive in gardens; and they were very few in numbers on the sea-coast, where they swarm in ordinary seasons. In *Coleoptera* some good things were taken, which will be noticed elsewhere. I never recollect a season in which so few saw-flies were astir; the only species noticed was the one which infests the gooseberries. *Hemipterous* insects were exceedingly scarce, and although the water species were plentiful enough, yet many of them wanted wings, most likely from the deficiency of heat.

Of many thousands of *Gerris paludum*, seen in the Ouse-burn in October, not one had wings, or even wing cases. I took some small bugs *in copulâ*, early in March, which appears rather remarkable, as these insects are in the perfect state only in summer or autumn. Another peculiarity of this remarkable year was the abundance of winged *Aphides* in May, which were flying in great numbers in the lanes on the few warm still days we had towards the end of that month. I beat a grown species (apparently the *Callipterus betulæ*, Koch's *Aphiden*, fig. 289), in great numbers, out of birch, on the 18th of May, of which fully one-half had wings. I need scarcely observe that *Aphides* are produced in spring from eggs laid the previous autumn; these young are all without wings, and females, they in their turn produce other wingless females alive, and so on through many generations, until towards autumn, when winged males and females appear, and it is this brood which provides for the continuation of the species, and which, taking wing, are often forced upon our notice by their numbers on warm still days. Midges were also not wanting, as I found to my cost when beating the hedges in Cumberland. Neither were "Clegs" wanting, and I noticed a rare Tabanus *(Austriacus)* much too abundant for the comfort of a farmer's horses near Lannercost.

XXXIV.—*Coleopterous Insects added to the Fauna of Northumberland and Durham, in* 1861. By Thomas John Bold.

1. *Amara obsoleta*, Dej. Taken beneath a dead crab, near Cullercoats, in May.
2. *Bradycellus distinctus*, Dej.—Faune Francais, i., 142. Marsden, Mr. Perkins; I have a specimen in my own collection, hitherto over-looked, and which, I think, was taken near South Shields.
3. *Haploglossa prætexta*, Er.—Kraatz, ii., 82. Long Benton, May 31, in a bottle sunk in the earth near a hot bed. A most excellent trap for small beetles, especially if baited with pieces of skin, bones or small birds.

4. *Oxypoda luteipennis*, Erich.—Kraatz, ii., 162. Hot Beds, Long Benton. May and July.
5. *Homalota pagana*, Erich.—Kraatz, ii., 206. Very rare, Ouse-burn Dene. October.
6. *Gyrophæna gentilis*, Erich.—Kraatz, ii., 355. In fungi, Gosforth. July and August.
7. *Gyrophæna affinis*, Sahlb.—Kraatz, ii., 357. In fungi, Gosforth. October. Very rare.
8. *Gyrophæna minima*, Erich.—Kraatz, ii., 259. In fungi, Gosforth. September.
9. *Conurus immaculatus*, Steph.=*fusculus*, Erich.—Kraatz, ii., 426. Very rare, Marsden. Mr. Perkins.
10. *Quedius humeralis*, Steph.=*suturalis*, Kraatz, ii., 51. Rare. Long Benton, in the before mentioned trap. March.
11. *Quedius fulvicollis*, Steph.=*collaris*, Kraatz, ii. 515? Beneath moss, Gosforth. March. Rarely.
12. *Meligethes limbaris*, Sturm.—Erichs. Insecten, iii., 172. Gosforth, Boldon Flats, Lumley. May, September.
13. *Meligethes tristis*, Sturm; Pl. 309, Fig. a.A.l. I took several specimens of a very strongly marked insect, on the Viper's Bugloss, at Cambois, in July, and which appears to me to be identical with Sturm's figure. If so, it is an addition to the British fauna.
14. *Cryptophagus setulosus*, Sturm; Pl. 316, Fig. B. Amongst dead leaves at Little Benton. May.
15. *Cryptophagus pilosus*, Gyll.—Sturm Pl. 313, Fig. A. Not uncommon in the "trap" at Long Benton.
16 *Cryptophagus pubescens*, Sturm; Pl. 318, Fig. B. Rare, Newcastle. October.
17 *Cetonia ænea*, Andersch.=*metallica*, Erich., Ins. iii., 59. Near Stranton, Rev. R. Kirwood. A beautiful addition to our fauna, and abundantly distinct ("*mesosterni processu porrecto, dilato, plano, apice truncato*") from *aurata*.
18 *Corymbites castaneus*, Linn.=*Ctenicerus castaneus*, Steph., Illust., and Manual. Sea-coast near Hawthorne Dene, on the Club's Field Day. Rev. R. Kirwood.

19 *Byturus fumatus*, Fab. Much like its congener *tomentosus*, but more elongate, and darker in colour. It appears to be equally common.

20 *Haliplus flavicollis*, Sturm.=*impressus* Steph. In the quarry-hole at Closing Hill, near Killingworth. Rare. October.

XXXV.—*Entomological Notes for the year* 1861. By V. R. Perkins.

Not only in our own district, but throughout England, nay throughout Europe, have entomologists been complaining that there are no insects; from the beginning of the spring to the commencement of winter, there has been a very great scarcity of insect life. Cold and wet as last year was, larvæ of all kinds seemed abundant, and it was thought that this season, if fine, would have been an unusually good one for insect hunters; these predictions have not been verified, the prophets prophecied falsely and contrary to all expectations, insects never were scarcer. Bees, beetles, butterflies, and bugs, as our cabinets can testify, have made a sorry show. Some usually common, have not put in an appearance, of others, perhaps one or two solitary specimens have been seen, but nothing has been abundant, save and except Wasps; these certainly have proved the rule, they have had it all their own way, not only here, but in the south as well, "from John o' Groats to Land's End," everybody says, we have *plenty of wasps*. There was an abundance of them in the spring—at Gibside when we went to seek *Andrenidæ* we found nothing but *Vespidæ*—when we went out, later on in the summer, for beetles, butterflies, and bugs, nothing was noticed but wasps, and in the autumn their numbers had not diminished. How are we to account for this superabundance of wasps, when even the common house-fly was not found as usual in the cream jug at breakfast, nor on the sugar at tea? Such, however, was the case, and

such also was the case in the year 1853. The same superabundance of wasps, the same scarcity of other insects. (See Mr. Bold's notes for that year.)

Lepidoptera.—Butterflies it was no use looking after. The Orange-tip I saw but once. The Tortoise-shell, one on Good Friday, and one since, one red Admiral, no large Whites, and but few small ones; the Meadow Browns, where were they? did anybody see them? The Blues held their ground for a few days in exceedingly limited numbers, and then they disappeared. But I must not omit mentioning, in order to keep up the spirits of our younger brethren of the net and pin, the occurrence of three of our rarer Sphingidæ in the district, *A. atropos*, the "Death's Head," was captured at Wylam, *S. convolvuli*, in Newcastle, and *D. galii* at South Shields. Moths were few, and in many instances of smaller size than usual, this was the case also in the south, probably the effects of the cold and damp upon the larvæ.

Coleoptera.—Land Beetles of all kinds were scarce, and Water Beetles it was particularly remarked, were in greatly diminished numbers, some of common occurrence were rare, others, local, have not been found. The common Cock-chafer I only saw three times all the summer, and the Coast-chafer (*Anomala Frischii*) though sought for particularly in its usual haunts, (the links beyond South Shields) where it was abundant last year, has not been seen.

Hymenoptera.—Bombi few, but their parasites the Apathi, one kind particularly, (*A. campestris*) was common in the autumn, this is another problem which wants elucidation; other Bees rare, exceedingly so. Ichneumons and Saw-flies, the same.

Diptera.—From the Daddy-long-legs to the smallest black Dung fly in greatly restricted quantities.

Such has been the state of the insect world during the season in this part of the country, and though want of success may have damped the ardour of some of the young beginners, I hope in no instance that the fire has been quite extinguished, but trust that the sight of their empty boxes, and blank spaces, when the spring returns, will give them a fresh impetus to pursue this very interesting branch of natural history—Entomology.

XXXVI.—*Supplement to a Catalogue of the Zoophytes of Northumberland and Durham.* By Joshua Alder.

Class. ANTHOZOA, *Ehrenberg.*

Order. HYDROIDA, *Johnston.*

Family. TUBULARIADÆ, *Van Beneden.*

3. HYDRACTINIA, *Van Beneden.*

2. H. areolata, *n. sp.* Pl. IX., fig. 1—4.

Polypary encrusting, consisting of a solid chitinous expansion, from which arise simple linear spines in regular groups, having areolar spaces between them. *Polypes* naked, small, white, columnar; slightly enlarging above, and terminating in a conical mouth, below which is a single circle of from six to ten linear tentacles, appearing of different lengths from their varying contractibility. Gonophores (reproductive organs) sessile on the chitinous base, large, globular or slightly pear-shaped, containing each a single medusoid. Height of polype about $\frac{1}{10}$ of an inch.

Medusoid, with a moderately deep, sub-globose umbrella; having four golden-yellow radiating canals, at the bulbous bases of which, on the margin of the umbrella, are four rather short tentacles; four shorter ones alternate with them, and intermediate between these are four others, almost tubucular. The peduncle is rather long and columnar, with four tufts of thread-cells surrounding the mouth.

A single specimen only of this interesting little *Hydractinia* was obtained, parasitical on a dead shell of *Natica Alderi*, brought in by the fishing boats at Cullercoats. I have since seen a dead and rather worn specimen, upon *Natica Grœnlandica*, among the zoophytes collected in Shetland by the Rev. A. M. Norman. The species differs from *H. echinata* in its much smaller size, the simple linear form of its spines, their irregular grouping, and

more especially in its bearing medusoids. These latter spring from the encrusting base. No capsule could be detected, but this might possibly arise from its great transparency. The medusoids bear a great resemblance to those of *Podocoryne carnea*, Sars, the only difference being in their having eight intermediate tubercular tentacles. In this respect they also differ from the medusoid of a Hydroid Polype, described by Professor Lovén, and referred by him to *Hydractinia*, but which appears rather to belong to the genus *Podocoryne*, as the base was not horny or spinous. As far as I am aware, therefore, this is the only instance in which medusoids have been ascertained to be produced by a true *Hydractinia*.

3*. PODOCORYNE, *Sars.*

1. P. Alderi, *Hodge.*

Hodge, in Trans. Tynes. Club, v. v., p. 82, t. ii., f. 10—15.

On a *Serpula* from deep water, Seaham Harbour.—*Mr. Geo. Hodge.*

This species differs from the *P. carnea* of Sars, principally in the form of the medusoid, which somewhat resembles that of an *Atractylis*.

4. CORYNE, *Gærtner.*

1. C. eximia, *Allman.*

Coryne Listerii, Alder in Trans. Tynes. Club, v. iii., p. 102.

Coryne eximia, Allm. in Ann. Nat. Hist., 3rd ser., v. iv., p. 141.

At the time of the publication of our local Catalogue of Zoophytes, the British species of *Coryne* were very imperfectly understood, but they have since been more carefully investigated, and several new species have been described. Among these is the one now under consideration, which I had referred to the *Syncoryne Listerii* of Van Beneden. Specimens kindly sent me by Professor Van Beneden, however, prove his species to be synonymous with the *Coryne ramosa* of English authors. I

therefore adopt the name recently given to this species by Professor Allman. Besides the locality formerly given, I have met with *C. eximia* at Cullercoats and Tynemouth, and Mr. Hodge also gets it at Seaham Harbour. It appears to be the most common species of our coast.

3. C. Sarsii, *Lovén.*

Syncoryne Sarsii, Lov. in Svenske Vetensk. Acad. Handl., 1835. Sars, Fauna Litt. Norv., pt. i., p. 2, t. i., f. 1—6.

Syncoryne decipiens, Dujardin in Ann. des Sc. Nat., 3rd. ser., v. iv., p. 275, t. xiv., f. B, 1—6.

On the roots of *Laminariæ;* rare. Cullercoats.

I have met with this species only once or twice on our coast. It is the smallest and most delicate of our *Corynes*, seldom rising above a quarter of an inch in height. The stem is not at all annulated.

4. C. implexa, *Alder.*

Tubularia implexa, Alder in Trans. Tynes. Club, v. iii., p. 108, t. ix., f. 3—6.

Coryne pelagica, idem in Trans. Tynes. Club, v. iii., p. 103, t. ix., f. 1, 2.

Coryne Briareus, Allman in Ann. Nat. Hist., 3rd ser., v. iv., p. 54.

Some confusion has arisen about this species, the polypary of which I described under the name of *Tubularia implexa* in my Catalogue, not having at that time been able to ascertain the character of the polypes, from which alone the genus in this group can be properly determined. Dr. T. Strethill Wright, however, has since met with it in a living state, and has found it to belong to the genus *Coryne*. The *Coryne* figured in my Catalogue under the provisional name of *Coryne pelagica* (t. ix., f. 2), appears, in fact, to be the young of it. I have lately met with it again in this state at Cullercoats, and have ascertained that its medusoid is similar to the one described by Professor Allman as that of his *C. Briareus*, which I now think, with Dr.

Wright, must also be referred to the same species. Specimens sent me from the Frith of Forth by the latter gentleman are intermediate in size between my *Tubularia implexa* and *Coryne pelagica*. The more humble growth appears to be not uncommon on our coast, as I have met with it several times on old crusted shells of *Fusus antiquus*, and Mr. Hodge has lately sent it me from Seaham Harbour, creeping over *Cellularia pumicosa*. As the curious and beautiful medusoid of this species has not yet been figured, I have given a representation of it in Pl. X., fig. 4.

4*. DICORYNE, *Allman*.

1. D. CONFERTA, *Alder*. Pl. VIII., fig. 1, 2.

Eudendrium? confertum, Ald. in Trans. Tynes. Club, v. iii., p. 103, t. iii., f. 5—8.

Dicoryne stricta, Allm. in Ann. Nat. Hist., 3rd ser., v. iv., p. 370.

Dicoryne conferta, Allm. in Ann. Nat. Hist., 3rd ser., v. viii., p. 168.

Professor Allman established the genus *Dicoryne* for a zoophyte dredged in Orkney, in the summer of 1859, which proves to be identical with my *Eudendrium confertum*, a circumstance not at first recognised on account of the absence of reproductive capsules in the specimens I described from. Having since found several specimens at Cullercoats, with both male and female gonophores, the identity of the two supposed species has been placed beyond a doubt. I have, therefore, adopted Dr. Allman's genus, though not without some misgivings as to the characters on which it is founded. The diversity of the reproductive organs is so remarkable, both in this family and in the *Campanulariadæ*, even where the genus is evidently natural—as in *Coryne*, for instance—that it seems impossible to found new genera on these organs alone, without having recourse to endless subdivisions. I am, therefore, more inclined to take the character of the polypes as the basis of generic grouping in this family, allowing other characters to modify this view according to their importance or permanency. The form and position of the tentacles are of great importance in a generic point of view, and where these are simply

linear, and placed in a single verticil, as in the present section of the family, lately included under *Eudendrium*, the form of the mouth and the power of retraction of the polype within the tubular polypary, may be taken into consideration, as well as the character of the polypary itself. In *Eudendrium*, as now restricted, the polypes are non-retractile, and have a broad trumpet-shaped mouth. In the *Atractylis* of Dr. Wright, the polypes are retractile, and have a conical mouth. The polype in *Dicoryne* has also a conical mouth, but is non-retractile. Upon these characters, therefore, I should be inclined to found this genus; and it becomes a question whether other genera lately proposed ought not to be included in it; as, for instance, the *Corymbogonium*, proposed by Professor Allman, for my *Eudendrium capillare*, which I believe to have a non-retractile polype with a conical mouth; and the *Garveia* of Dr. Wright, in which the same characters are found. These genera can only be kept apart from the circumstance of some diversity in the gonophores or their products. But even in the gonophores the discrepancy is not great. The reproductive organs in *Corymbogonium* are produced at the ends of separate branches, and also arise from the creeping base. In this they agree with those of *Dicoryne*, but they differ from that genus in their bilocular character, and in the absence of the central prolongation (gonoblastidia of Allman), which homologically is considered to represent a polype destitute of tentacles and mouth. Professor Allman, however, very correctly remarks that the enlarged basis, to which these gonophores are attached in *Corymbogonium*, is manifestly the representation of a polype, and corresponds to the gonoblastidia of *Dicoryne*. It is also worthy of remark that moniliform gonophores, exactly similar to those of *Corymbogonium*, and arising from short branches, have been found by Dr. Wright on a true *Eudendrium*, his *E. arbuscula*, and that the *E. rameum* has also moniliform gonophores, but in a different position, being in this instance placed below the tentacles of the polype. The gonophores of *Garveia nutans*, Wright (*Eudendrium bacciferum*, Allman), though produced only singly, also terminate arrested lateral branches. I am disposed, therefore, to consider these

three genera as constituting only one, unless some further distinction can be pointed out between them.

The free natatory zooid of *Dicoryne conferta*, lately discovered by Professor Allman, is of a very peculiar form, and partakes but slightly of the medusoid character.

2. D. CAPILLARE, *Alder*.

Eudendrium capillare, Ald. in Trans. Tynes. Club, v. iii., p. 105, t. iii., f. 9—12.

Corymbogonium capillare, Allm. in Ann. Nat. Hist., 3rd ser., v. viii., p. 168.

For the reason stated above I have placed this species provisionally in the same genus as the last. Its mode of reproduction has not yet been ascertained.

4**. ATRACTYLIS, *Strethill Wright*.

The genus *Atractylis* has been established by Dr. T. Strethill Wright, for a group of Hydroid Zoophytes resembling *Eudendrium* in many of its characters, but differing in the conical form of the mouth of the polype, and its retractibility (partial or complete), within the tubular polypary. They are generally of small size and seldom branched.

1. A. REPENS, *Wright*.

Eudendrium repens, Wright in Edin. N. Phil. Journ. 2nd ser., v. vi., t. ii., f. 8, 9.

Atractylis repens, Wright in Edin. N. Phil. Journ., 2nd ser., v. ix., p. 108, t. i., f. 4, 5.

On *Dentalium entalis* and other shells from the fishing boats, Cullercoats.

Atractylis repens is of humble growth, and very rarely branched. Its mitre-shaped medusoid, which I have occasionally had the opportunity of examining, is remarkable for the length of its two filiform tentacles.

2. A. LINEARIS, *n. sp.* Pl. X., fig. 1, 2, 3.

Polypary, linear, horn-coloured, unbranched (?), nearly

smooth, a little undulating, and slightly wrinkled on the lower part; the stems united together by reticulated creeping tubes at the base. *Polypes*, slender, retractile, with eight long muricated tentacles, held alternately up and down. Gonophores, pear-shaped or sub-globular, set two or three together on the stem of the polypary, each capsule containing a single medusoid. Height a quarter of an inch.

Medusoid globose, slightly truncated below, with a contracted aperture. Four moderately sized, sub-clavate tentacles arise from four semi-circular yellowish lobes, at the margin of the umbrella ; sub-umbrella small, with four radiating canals, the centre occupied by a mass of yellowish or orange granules, apparently ova ; peduncle inconspicuous, branched at the base.

On *Turritella communis*, *Astarte Danmoniæ*, and other shells from deep water, Cullercoats.

This species has considerable resemblance to *A. repens*, but its polypary rises much higher, is proportionately more slender, and not so much expanded at the aperture. In the young state, however, it is difficult to distinguish them. Their medusoids, nevertheless, are very different, and prove them to be distinct species. I have never seen *A. linearis* branched, though it is possible it may occasionally be so in luxuriant specimens.

3. A. ARENOSA, *n. sp.* Pl. IX., fig. 5—7.

Polypary, minute, consisting of a creeping fibre, from which arise short funnel-shaped tubes, rather irregular in form, but always expanding more or less at the top, from which the polypes issue; generally covered with minute grains of sand. *Polypes* entirely retractile, with long, slender, muricated tentacles, varying in number according to age from six to twelve.

On the under side of stones and the roots of *Laminariæ*, at Tynemouth and Cullercoats, occasionally.

All the hitherto described *Atractyles* are propagated by medusoids, but this species proves to be an exception, as Dr. Wright,

who has lately met with it in the Frith of Forth, has ascertained that it produces planuloid young direct from the summit of the ovarian sac. This affords another proof of the difficulty of establishing a genus from the mode of development in this tribe.

4. A. RAMOSA, *Van Beneden.*

Eudendrium ramosum, Van Ben. Rech. sur les Tubul. p. 56, t. iv. Dalyell. Rare and Rem. Anim. Scotl., v. i., p. 64, t. 11.

Atractylis ramosa, Wright in Edin. N. Phil. Journ., new ser., v. ix., p. 108, t. viii., f. 1—3. Hincks in Ann. Nat. Hist., 3rd ser., v. viii., p. 160.

Fine specimens of this species have been procured from the deep-water boats, but unfortunately in a dead state. The polypary, from its numerous branches and compound stem, has very much the appearance of an *Eudendrium*. This species must not be confounded with the *E. ramosum* of Johnston, which is a true *Eudendrium*.

6. TUBULARIA, *Linnæus.*

2. T. SIMPLEX. Pl. VIII., fig. 3, 4.

Tubularia Dumortierii, Johns. Brit. Zooph., p. 50, t. vii., f. 1, 2. Alder in Trans. Tynes. Club, v. iii., p. 106.

Polypary, a slender, smooth, unbranched tube, without annulations ; generally a little bent or angulated at intervals, and tapering towards the base ; of a horn colour, but appearing orange or scarlet when alive, from the contained animal; usually solitary and attached by a short creeping base. *Polype* terminal, slender, rose-coloured ; the tentacles whitish, the upper circle biserial, shorter and less numerous than in *T. indivisa*, the lower circle containing about twenty to twenty-four in a single series, and moderately long. Height of polypary 2 to $2\frac{1}{2}$ inches.

On shells and other marine bodies from deep water, Cullercoats.

Following the opinion of Dr. Johnston, I had formerly con-

sidered this species to be the *T. Dumortierii* of Professor Van Beneden; specimens sent me by that distinguished naturalist, however, prove that his *T. Dumortierii* is different from this; being a much smaller species, not more than three quarters of an inch high, and annulated at the base. The head also is proportionally larger.

T. simplex is not unfrequently met with from deep water at Cullercoats, and is distinguished from *T. indivisa* by its solitary character, and much smaller size; from *T. gracilis*, by being unbranched and without annulations.

A large *Tubularia*, twelve to fifteen inches in length, resembling *T. indivisa*, but generally solitary and unbranched, with the young adhering to the side of the adult, occurs not unfrequently on this coast. This appears to be the *Tubularia gigantea* of Lamouroux, which Dr. Johnston considered to be a variety of *T. indivisa*. There is some reason, however, to think that it may be a distinct species, and it is therefore desirable that it should be examined in a perfect state.

7. CORYMORPHA, *Sars*.

1. C. NUTANS, *Sars*.

Forb. and Goods. in Ann. Nat. Hist., v. v., p. 310.
Johns. Brit. Zooph., p. 54., t. vii., f. 3—6.

This fine species has been dredged in considerable numbers by Mr. George Hodge, in from six to ten fathoms water, on a sandy bottom, at Seaham Harbour. (See p. 80 of the present volume.)

2. C. NANA, *Alder*. Pl. XI.

Alder in Trans. Tynes. Club, v. iii., p. 108.

It is now nearly twenty years since I first met with this interesting little species, at Newbiggin, from which time I had looked for it often without success, until the summer of 1860, when I fortunately obtained two living indivduals at Cullercoats. This puts me in a position to add considerably to the information hitherto published concerning the species, as well as to give more correct drawings of it in a living state. *Corymorpha nana* is a very active animal—constantly changing its form, and the

proportion of its parts. Sometimes the head is elongated into a slender tube, sometimes contracted so as to become nearly globular. The tentacles and body are equally subject to dilatation and contraction in their different parts. In many of its states it bears a considerable resemblance to *C. nutans*, from which, however, it differs not only in its diminutive size, but in the gonophores being sessile (not pedunculated or branched as in the latter), and large in proportion to the size of the animal. The medusoid differs from that of *C. nutans* in having the umbrella rounded at the top; in other respects it is very similar. The following detailed description will show the character of this species more distinctly.

Head sub-tubular, yellowish; the mouth conical, surrounded by about sixteen or eighteen short tentacles, forming two imperfect rows. A single circle of fifteen to twenty long filiform tentacles surrounds the base of the head, immediately above which the gonophores form another circle of urn—or bell-shaped bodies, in different stages of development; these are sessile, and in their more advanced state assume the perfect medusoid form, shewing lively motions of systole and diastole for some time before becoming free. The body of the polype is elongated, tubular, and tapering to a point at the base; it is soft and flexible, transparent white or yellowish, with opaque white lines. It is enclosed in a transparent filmy sheath, ending at the base in a gelatinous mass (coletoderm of Wright?), by which the animal is attached, though slightly, the pointed base of the fleshy body (cœnosarc) being free. Tubercles arise from the lower ends of the opaque white lines, which frequently enlarge into linear processes, whose use is not very apparent. They may possibly form additional organs of attachment, but in the specimens examined their ends were free. Length of polype $\frac{1}{2}$ to $\frac{3}{4}$ of an inch.

Medusoid, with a rather deep, semi-globose, transparent white umbrella, having four yellowish radiating canals; three of them ending in a yellow bulb at the margin of

the umbrella, the fourth produced into a club-shaped tentacle, apparently not capable of much extension. The peduncle is rather long and thick, terminating in a plain rounded mouth.

These medusoids were produced from one only of the individuals obtained; the other had gonophores of a different shape, having tuberculated lobes rising somewhat irregularly from the upper part, as represented in fig. 5. These reproductive bodies were also sessile, and remained attached during the whole time that the polype continued to live—about ten days—without shewing the least signs of assuming the medusoid form. Indeed their appearance was very different from that of the same organs in the medusa-bearing individual, and I have little doubt of their remaining permanently fixed. This difference in the reproductive organs in different individuals of the same species has not been before observed, as far as I am aware, in this genus. They probably represent a sexual distinction. Professor Sars has met with a *Corymorpha* on the Norwegian coast (*C. glacialis*, Sars), in which the gonophores are persistent, and apparently somewhat similar to the non-medusoid form of this species, but in the Norwegian zoophyte both sexes were found to have the same character.

Family. SERTULARIADÆ, *Johnston.*

8. HALECIUM, *Oken.*

4. H. labrosum, *Alder.*

Ald. in Trans. Tynes. Club, v. iv., p. 178, t. xii.

This species has not been met with again since the notice of it appeared in these Transactions.

5. H. tenellum, *Hincks.*

Hincks in Ann. Nat. Hist., 3rd ser., v. viii., p. 252. t. vi., f. 1—4.

Parasitical on other zoophytes from deep water; occasionally.

I had at first considered this as probably a very young state

of *H. labrosum*, and as such had noticed it in my description of that species (v. iv., p. 179). It has since been described by Mr. Hincks under the above name, in his excellent "Catalogue of the Zoophytes of South Devon and South Cornwall," and on a further examination of additional specimens, I now agree with that gentleman in considering it a distinct species. It is very minute, and of great delicacy; the polypary being perfectly transparent and nearly colourless. North country specimens have the stem more strongly ringed and wrinkled than those figured by Mr. Hincks from the Devonshire coast—a circumstance that adds much to the elegance of their appearance.

6. H. FILIFORME, *n. sp.*

Polypary, very slender, flexible, simple, or consisting of a single tube throughout; the stem not much branched; branchlets short, alternate, arising from the side of a cell; the internodes rather long; cells rather slender, tubular, with a slightly everted margin. Length 4½ inches.

This species is distinguished from all those of similar size belonging to the same genus, by having the stem simple and uncompounded throughout its whole length, as well as by its very slender, thread-like form and great flexibility; most of the species of this genus becoming rigid when dry. It has occurred to me only once, when I obtained a few specimens together, apparently torn from the same base. The reproductive capsules were absent, but there can be little doubt of its distinctness from any described species.

9. SERTULARIA, *Linnæus.*

1*. S. GAYI, *Lamouroux.*

Sertularia Gayi, Lamx. Exp. Meth., p. 12, t. lxvi., f. 8, 9. Hincks in Ann. Nat. Hist., 3rd ser., v. viii., p. 252.

Sertularia polyzonias, var. β, Johns. Brit. Zooph., p. 61, t. x., f. 2.

From the deep-water boats; occasionally.

Until lately this species has been confounded by British

authors with the *S. polyzonias*, from which it is distinguished by its more robust and rigid habit, and its compound stem. The cells also frequently assume a wrinkled appearance. The observations in my Catalogue (v. iii., p. 111) on *S. polyzonias* apply more properly to this species.

12. PLUMULARIA, *Lamarck.*

9. P. HALECIOIDES, *Alder.*

Ald. in Ann. Nat. Hist., 3rd ser., v. iii., p. 353.
Idem in Trans. Tynes. Club, v. iv., p. 177, t. xi*a*.

Since my former notice of this interesting zoophyte, it has been met with by Mr. Barlee in Shetland, and occasionally again on this coast, but it is by no means common.

FAMILY. CAMPANULARIADÆ, *Johnston.*

13. LAOMEDEA, *Lamouroux.*

2. L. LONGISSIMA, *Pallas.*

In attempting to discriminate several species of *Laomedea* that had previously been confounded, I pointed out (Trans. T. C., v. iii., p. 121) that the *L. longissima* (Pallas) had a denticulated cell, while that of *L. dichotoma* is smooth. The figure there given (t. v., f. 4), however, is erroneous, and was probably taken by mistake from a branched variety of *Camp. Johnstoni*. The crenulations of the cells in *L. longissima* are shallow and truncated at the apex, as has been ascertained by Mr. Hincks from fresh specimens got on the Devonshire coast. I have since obtained young individuals with the same characters at Cullercoats.

5. L. NEGLECTA, *Alder.*

I have lately met with a few individuals of this species, at Cullercoats, bearing ovicapsules. Mr. Hincks has ascertained that "the ova are developed into the perfect larval form within an external gelatinous marsuphium."

5*. L. LOVENI, *Allman.*

Allm. in Ann. Nat. Hist., 3rd ser., v. iv., p. 137.

Several specimens of this species were found on the outside of stones between tide-marks, at Cullercoats, in the summer of 1860; and I also met with it more sparingly in the following year. They were of the small variety mentioned by Professor Allman, and shewed the peculiar mode of reproduction for which this species is remarkable.

6. L. LACERATA, *Johns.*

Besides the locality formerly given, this species has been met with occasionally at Cullercoats.

7. L. ACUMINATA, *Ald.*

Specimens kindly sent me by Professor Van Beneden prove that this is the species on which he has founded his genus *Campanulina* (Bull. Acad. Roy., Belg., v. xiv.); a distinction which the peculiar form of the polypes and polype-cells may be considered to warrant. An interesting account of the development of *L. acuminata* is given by Dr. T. Strethill Wright, in the Edinburgh New Philosophical Journal, n. s. v. vii. p. 108.

14. CAMPANULARIA, *Lamarck.*

2. C. JOHNSTONI, *Alder.*

It has been satisfactorily ascertained that a deep-water variety of this species is undoubtedly branched, a circumstance considered probable at the time of the publication of my Catalogue. As before stated, the figure there given as the young of *L. longissima* turns out to be the branched variety of *C. Johnstoni*, several examples of which have since been found. The more advanced specimen mentioned in the Catalogue, probably belongs to some species yet undescribed.

3*. C. RARIDENTATA, *n. sp.* Pl. X., fig. 5.

Polypary, with a creeping stem, from a slight bulbous expansion of which arise at intervals rather short pedicles, ringed above and below, and terminated by a single cell. Cells rather long and narrow, tapering a little below, and with five or six deep pointed crenulations round the margin. Height $\frac{1}{20}$ of an inch.

Parasitical on other Zoophytes from deep water, Cullercoats, occasionally.

This delicate little *Campanularia* bears great resemblance to *C. Johnstoni*, from which it is distinguished by its much smaller size, by its cell being much narrower, and not having more than half the number of denticles on the margin, and also from the pedicles springing from a bulb at the base. It is sometimes associated with *C. Johnstoni* and other closely allied species, but may generally be detected at once by its greater minuteness and delicacy. Mr. Hincks states that this species is not uncommon on the Devonshire coast.

8. C. FRUTICOSA, *Sars.*

Campanularia fruticosa, Sars in Nyt. Mag. Naturr. (Christiania), v. vi., p. 138.

Campanularia gracillima, Alder in Trans. Tynes. Club, v. iii., p. 129, t. vi., f. 2-5.

This species, which I described under the name of *C. gracillima*, is apparently the same as the *C. fruticosa* of Sars, previously published in a Norwegian periodical, which I had not until lately the opportunity of seeing.

9. C. HUMILIS, *Hincks.*

Calicella humilis, Hincks, *m.s.*

On other Zoophytes from deep water occasionally.

16. GRAMMARIA, *Stimpson.*

G. ROBUSTA, *Stimpson.*

Grammaria robusta, Stimp. Invert. of Grand Manan, p. 9, t. i., f. 3*a*, 3*b*.

Campanularia abietina, Sars in Nyt. Mag. Naturv., v. vi., p. 139.

Grammaria ramosa, Ald. in Trans. Tynes. Club, v. iii., p. 130., t. vi., f. 1—4.

I adopt the opinion of M. Sars, lately communicated to me by letter, that this species, which we had each described by a different name, must be referred to the *G. robusta* of Stimpson.

The specimens from which Professor Stimpson described, however, were of very humble growth compared with individuals got on this coast. Fine examples, nearly four inches in height and much branched, have occurred to me from the deep-water boats. My lamented friend, Mr. Barlee, also met with it in Shetland. As no gonophores have yet been discovered in this species, its mode of reproduction still remains in obscurity.

Order ASTEROIDA, *Johnston.*

Family. PENNATULIDÆ, *Fleming.*

20. VIRGULARIA, *Lamarck.*

V. Christii, *Koren and Danielssen.*

Kor. and Dan. in Mag. f. Naturv., 1847, p. 269, f. 3. Idem in Fauna Litt. Norv., 2nd Pt., p. 91, t. xii. f. 7—12. Sars in Fauna Litt. Norv., 2nd Pt., 7. 71.

A notice of the occurrence of this fine species on our coast was inserted in the present volume, p. 60, and some account of it was there given. As, however, our specimens differ in some respects from the description given by Messrs. Koren and Danielssen in the "Fauna Littoralis Norvegiæ," I have thought it necessary to describe the British form more at length, premising that as the specimens were obtained from the fishermen in a dead state, the account of them must necessarily be somewhat imperfect.

Polypary, about 17 inches long, very slender, linear, with the upper part curved into an arch. The lower and sterile portion of the stem, occupying from a fourth to a fifth part of the entire length, is slender and cylindrical above, and scarcely more than one tenth of an inch in diameter (when dry); about three quarters down, however, it swells abruptly to three times that breadth, and is a little flattened, tapering from thence into an obtuse recurved point. About three fourths of the upper portion of the polypary is covered with rather small sessile polype-cells, which are arranged in two very oblique rows in front, sloping towards the centre. At first these rows have a central space between them, but higher up they

approach so close as to touch each other. The upper rows contain five or six cell each, decreasing in number below. The dorsal ridge is bare, but the polype-cells twist once round the axis during their course. The curved portion of the stem does not occupy more than a tenth part of the whole length, and at that part the fleshy base of the cells extends into a web-like expansion. The cells are conical, terminating in two unequal points above. Their walls contain linear calcareous spicula in bundles converging to these points. The polypes also contain spicula.

The osselet, or central bony axis, extending the whole length of the polypary, is linear, cylindrical, and very slender; but becomes thicker and fusiform towards the base. It terminates above in a fine curved filament.

In the Norwegian specimens the polypary is 26 inches in length, and the curve occupies about a third of the whole, whereas in British examples the entire length (in the three specimens obtained) is not more than 17 inches, and the curve is not more than one-tenth of the whole length. A more striking peculiarity consists in the web-like expansion of the polypiferous base in the curved portion; but this may possibly be occasioned by the contraction of the fleshy part in drying, and as dead specimens only have been obtained, these small discrepancies cannot be considered sufficient to constitute a specific distinction.

Professor Sars describes a fine *Virgularia* 40 inches in length, belonging to this section of the genus, in the "Fauna Littoralis Norvegiæ," under the name of *V. Finmarchia*. It was obtained by him in Finmark, and approaches very closely in many of its characters to *V. Christii*. These species differ from *Virgularia mirabilis* in containing calcareous spicula.

Order. HELIANTHOIDA, *Johnston.*

Family. ZOANTHIDÆ.

21*. ZOANTHUS, *Cuvier.*

1. Z. Couchii, *Johns.*

Johns. Brit. Zooph., p. 202., t. xxxv., f. 9.

Couch. Corn. Fauna, 3rd pt., p. 73., t. xv., f. 3.

Var. *Dysidea papillosa*, Johns. Brit. Spong., p. 190, wood-cut, f. 18.

Mammillifera incrustata, "V. Duben and Koren," Sars in Nyt. Mag. f. Naturv., v. vi, p. 140.

The typical form of the *Z. Couchii* has not been found on our coast, but the curious northern variety, *Mammillifera incrustata* of Norwegian authors, considered by some to be a distinct species, has occurred two or three times from deep water, forming a continuous crust moulded on shells, the substance of which has almost invariably disappeared, shewing an eroding or solvent power in the zoophyte.

This form had long been a puzzle to naturalists before its living polype had been discovered. It was before generally thought to be a sponge, and was introduced, with doubt, by Dr. Johnston into his "History of British Sponges," under the name of *Dysidea? papillosa*.

2. Z. Alderi, *Gosse*.

Zoanthus Alderi, Gosse, Act. Brit., p. 305, t. ix., f. 8, and t. xii., f. 5.

On the under surface of a stone at extreme low water mark, near the "Bear's Back," Cullercoats.

A single group of specimens of this delicate little milk-white zoophyte occurred to me in the above locality in the summer of 1857, since which time I have searched for it several times without success. It is very desirable that it should be again met with, as the specimens found were in a sickly state, and had not the tentacles expanded.

Family. ACTINIADÆ, *Gray*.

22*. STOMPHIA, *Gosse*.

1. S. Churchiæ, *Gosse*.

Gosse, Actin. Brit., p. 222, t. viii., f. 5.

This species was found by Mr. J. Stanger, at Craster, in 1859 (see Trans. Tynes. Club, v. iv., p. 189). I believe he has since found it at Cullercoats, where I have also met with one or two specimens.

CLASS. POLYZOA, *J. V. Thompson.*

ORDER. INFUNDIBULATA, *Gervais.*

SUB-ORDER. CYCLOSTOMATA, *Busk.*

FAMILY. TUBULIPORIDÆ, *Johnston.*

27. ALECTO, *Lamouroux.*

3. A. GRANULATA, *M. Edw.*

Johns. Brit. Zooph., p. 280, t. xlix., f. 1, 2.

On old shells from deep water; rather rare.

SUB-ORDER. CHEILOSTOMATA, *Busk.*

FAMILY. EUCRATEIDÆ, *Johnston.*

30*a*. HIPPOTHOA, *Lamouroux.*

1. H. CATENULARIA, *Jameson.*

Johns. Brit. Zooph., p. 291, t. l., f. 9, 10.

On *Modiola vulgaris* from deep water; rare.

FAMILY. MEMBRANIPORIDÆ, *Busk.*

34. LEPRALIA, *Johnston.*

20. L. AURICULATA, *Hassall.*

Johns. Brit. Zooph., p. 310, t. liv., f. 8.

Busk, Catal., p. 67, t. xc., f. 1, t. xciii., f. 1, 2, and t. cii., f. 1.

On shells from deep water; rare.

35. MEMBRANIPORA, *Blainville.*

9. M. LACROIXII, *Audouin.*

Flustra distans, "Hassall," and *Flustra fallax*, Johns. Brit. Zooph., p. 350, t. lvii., f. 11, 12.

Membranipora Lacroixii, Busk, Catal., p. 60, t. lxix.

A single fine specimen has occurred to me on a stone at low water mark, Tynemouth. The more recent cells had delicate

marginal spines on each side, which are not figured by Professor Busk, but are apparently represented in Dr. Johnston's t. lvii., f. 11.

Family. CELLULARIADÆ, *Busk.*

37. CELLULARIA, *Pallas.*

1. C. Peachii, *Busk.*

This zoophyte proves to be much more common in deep water than at first supposed. Numerous specimens have been obtained from the five-men boats.

37*a*. BICELLARIA, *Blainville.*

1. B. ciliata, *Linn.* (*Cellularia ciliata*, Catal., p. 148.)

Very fine specimens of this species have been got by Mr. Geo. Hodge, within tide marks at Seaham Harbour, where it appears to be not uncommon.

37*b*. MENIPEA. *Lamouroux.*

1. M. ternata, *Ellis* and *Sol.* (*Cellularia ternata*, Catal., p. 148.)

The same remark may be made of this species as of *Cellularia Peachii.* It is far from rare in deep water.

38. BUGULA, *Oken.*

5. B. Turbinata, *Alder.*

Ald. in Micros. Journ., v. v., p. 174, t. 17.

The first intimation of the occurrence of this beautiful species on our coast, was received from the Rev. G. C. Abbes, who kindly forwarded a specimen obtained at Whitburn. Mr. Hodge has since obtained very fine specimens from the rocks at low-water mark, Seaham Harbour.

6. B. plumosa, *Pallas.*

Soft Feather Coralline, Ellis. Corall., p. 33, t. xviii., f. *a*. A.
Cellularia plumosa, Pallas, Elench., p. 66,
Bugula plumosa, Busk, Catal., p. 45, t. liv.

The distinction between this species and the *B. fastigiata*, Linn., with which it had been previously confounded, has been already pointed out (Trans. Tynes. Club, v. iii., p. 150); but I was not at the time aware of its existence on our coast. Since then, however, specimens have been obtained from the deep water boats, and Mr. Hodge has also found it between tide-marks, at Seaham Harbour. Its range in depth appears, therefore, to be considerable.

Sub-Order. CTENOSTOMATA, *Busk.*

Family. ALCYONIDIADÆ. *Johnston.*

44. ALCYONIDIUM, *Lamouroux.*

8. A. LINEARE, *Hinks*, M.S.

This encrusting *Alcyonidium* occurs not unfrequently from deep water at Cullercoats, running over shells in lines, generally branching from a central mass. The cells are oval, with prominent tubular apertures.

44*a*. ARACHNIDIUM, *Hincks.*

1. A. HIPPOTHOOIDES, *Hincks*,

Hinks in Ann. Nat. Hist., 3rd ser., v. ix., p. 471, t. xvi., f. 2.

On the tests of Ascidiæ, shells, &c., from deep water, Cullercoats.—J. A. Seaham Harbour—George Hodge.

The appearance of this species is somewhat between *Hippothoa divaricata* and *Buskia nitens*, having much the habit of the former, with occasional lateral processes like the latter; but it differs from both in having the walls of the cells soft and membranous. From *Alcyonidium lineare* it differs in the cells being rather distant and united by a creeping fibre; in *Alcyonidium* they are contiguous.

Sub-Order. PEDICELLINEA, *Gervais.*

Family. PEDICELLINIDÆ, *Johnston.*

52. PEDICELLINA, *Sars.*

2. P. BELGICA, *Van Beneden.*

Van. Ben. Rech. Bryoz., 2nd Pt. t. ix.

Johns. Brit. Zooph., p. 385.

On other Zoophytes, Cullercoats ; rare.—J. A.

3. P. GRACILIS, *Sars.*

H. Goodsir in Ann. Nat. Hist., v. xv., p. 382.

Gosse, Ramb. Devon. Coast, p. 217, t. xii., f. 5.

On the under side of stones, and on the stems of Zoophytes, Cullercoats and Tynemouth ; common.—J. A.

This species, though by no means uncommon between tide-marks, and occasionally in deeper water, has been, until lately, overlooked on account of its diminutive size. The bulbous swelling at the base of the stem has been very appropriately called bottle-shaped. It affords a good distinctive character.

Mr. H. Goodsir observes that the propagation of *Pedicellina* is accomplished only by shoots coming directly from the root ; but I have met with two individuals of *P. echinata*, in which the case was otherwise. In one, the young arose from the body of the animal, and at right angles to it ; in the other, from the stem a little below the body. These cases, however, are rare.

EXPLANATION OF THE PLATES.

PLATE VIII.

Fig. 1. *Dicoryne conferta*, natural size.
2. The same, magnified.
3. *Tubulari simplex*, natural size.
4. A head of the same, magnified.

PLATE IX.

Fig. 1. Polypary of *Hydractinia areolata* on *Natica Alderi*, natural size.
2. *Hydractinia areolata*, highly magnified.
3. A portion of the polypary of the same, highly magnified.
4. Medusoid of the same, highly magnified.
5. *Atractylis arenosa*, natural size.
6. The same, highly magnified.
7. A tentacle of the same, much enlarged.

Plate X.

Fig. 1. *Atractylis linearis*, natural size.
2. The same, highly magnified.
3. Medusoid of the same, highly magnified.
4. Medusoid of *Coryne implexa*, highly magnified.
5. *Campanularia raridentata*, highly magnified.

Plate XI.

Fig. 1. *Corymorpha nana*, with medusoid gonophores, magnified.
2. Another individual, with persistent (non-medusoid) gonophores, magnified.
3. Medusoid gonophores, more highly magnified.
4. Free Medusoid, more highly magnified.
5. Non-medusoid gonophores, more highly magnified.

XXXV.—*Miscellaneous notices and observations.*

Fossil Fish in Magnesian Limestone at Fulwell Hill.—There has recently occurred, in the Magnesian Limestone at Fulwell, some interesting examples of Fossil Fish. The specimens belong to three, or probably four species of *Palæoniscus*, and to a single species of *Acrolepis*. Those of the former genus, are by far the most common, and nearly all of them belong to one species. Specimens of *Acrolepis* are exceedingly rare. Being satisfied that three of the species of *Palæoniscus* are new, I have provisionally described them in the "Annals and Magazine of Natural History," April, 1862, under the names of *Palæoniscus varians*, *P. latus*, *and P. Abbsii*. All the Palæonisci are small, the largest not being more than four inches in length. Along with the Fish have been found traces of Plants. These are rare ; and, as might have been expected, not so well preserved as the Fish ; they possess enough character, however, to show that they are the remains of terrestrial and not of marine vegetation. Most of these Fossils are found in a bed of slaty and laminated limestone, not more than two feet thick, and only a short distance from the base of the "Upper Limestone." The occurrence of Fish in this sub-division is of some importance, for no animal remains of higher organization than Mollusca had been previously known to exist in it ; nearly all the vertebrata of the Permian Series of this district being confined to the Marl Slate, which is near the bottom of the formation. They are, in fact, the last—as far as we know—of Palæozoic vertebrates ; and those which approach nearest in time to the higher forms of life in the succeeding or Mesozoic epoch. I may add, that on a future occasion, I hope to lay a fuller account of these discoveries before the club.—*J. W. Kirkby*, *June*, 1862.

Scarcity of Lepidoptera in 1861.—This year has been most remarkable, in this neighbourhood as elsewhere, for the unusual scarcity of *Lepidoptera*, even of the commonest species. The dates of their first appearance are also very much later than the usual ones, owing, I imagine, to the effects of the unprecedented cold and wet season of 1860.

In proof of this I may mention that I have never seen a single *Vanessa* the whole year round, not even the usually abundant *Urticæ* ; only two *A. Cardamines* in the beginning of July ; a few *Meadow Browns*, but no other *Hipparchiæ*; and a sprinkling of " Whites." *P. Alexis* and *C. Phleas* were however common.

The only common Moths were *H. Humuli* and *velleda*, *Oxyacanthæ*, *ferruginea*, and *Montanata*.

A curious variety of the female *H. Humuli* fell to my net. It was uniformly pale yellow, with hardly any visible markings, and very small. Also a black variety of *H. suffumata.*—*David P. Morison*, *Pelton*, 17*th October*, 1861.

A curious Habit of Agabus uliginosus.—I was, one morning last week, searching along a pond bank after a heavy shower of rain, for some *Chrysomelidæ*, which I found frequenting the flowers of the common butter-cup, when my attention was drawn to a dark creature attached to the stems of some high grass which grew near. Thinking it was one of the genus *Carabus*, I picked it off, when, to my astonishment, it proved to be *Agabus uliginosus.* Making further search, I soon found several others in a similar position They had all climbed the grass stems (some eight inches), as high as they would bear, in fact till they began to bend with the weight; and these *Agabi* appeared to be holding on tight by their fore legs, and with their head drawn inwards and revelling in the hot sun. That such an apparently clumsy beetle as the *Agabus* should perform such a feat as this, is a circumstance I think worth recording ; and it also explains the mystery of this insect being sometimes found in the bottom of the net when sweeping long grass and herbage by the sides of ditches. The *Agabi* appear to be fond of sunning themselves, for I have often found *A. maculatus* on the top of a dry stone wall, evidently enjoying the blaze of a July sun, and where it could only have got by using its wings ; but attached to the uppermost part of a blade of grass, is the last place I should ever have thought of for searching for any of this family.—*V. R. Perkins*, 17*th June*, 1861.

NOTICES TO MEMBERS.

One of the chief objects which the Club had in view at its formation, was the preparation of Catalogues of the Fauna and Flora of the Counties of Northumberland and Durham; much has already been done, but much yet remains to be accomplished. The following Catalogues are at the present time in the hands of competent members, who invite the assistance and co-operation of others who are pursuing the same studies.

MAMMALIA.—Henry T. Mennell, and Vincent R. Perkins. In this class, the Bats and Shrews are probably the least known, and specimens of either will be most acceptable. Information respecting the occurrence of Cetacea on our shores, and lists of the animals found in particular districts will also be of very great assistance.

ORNITHOLOGY.—John Hancock. Notices of the occurrence of rare Birds in the district should be forwarded.

FOSSIL FISH, &c.—It is the intention of Mr. Thos. Atthey (Cramlington), and Mr. J. W. Kirkby (Sunderland), to describe in the Transactions, some Animal Fossils that have been found in the coal measures at *Cramlington* and *Ryhope;* they are desirous of obtaining information of the occurrence of similar Fossils in other parts of the Northumberland and Durham Coalfield. The greater part of the materials which they propose describing have been collected by Mr. Atthey from the roof of the *Low Main*, and their abundance in the localities he has searched, renders it extremely probable that the distribution of such remains will prove to be wider than existing information will allow us to assert. They would therefore invite attention to the subject, more particularly the attention of those members who have opportunities of pursuing observations in colliery districts, and who may be willing to assist in our attaining an improved knowledge of the creatures that peopled this region during the formation of the coal and the deposition of the associated strata. The remains most likely to occur are those of FISH, *teeth*, *scales*, and *bones*, possibly *reptilian* remains and *mollusca*. Any member possessed of, and willing to impart information of this kind, may communicate with the gentlemen above named, either directly or through the Secretaries of the Club.

CRUSTACEA.—Rev. Alfred Merle Norman, M.A., Sedgefield.

ECHINODERMATA.—Mr. George Hodge, Seaham Harbour.

INSECTS.—*Lepidoptera*—Mr. George Wailes, Newcastle-on-Tyne.

Coleoptera—Mr. Thomas J. Bold, Long Benton, near Newcastle-on-Tyne.

Hymenoptera, &c.—Mr. Thomas J. Bold, and Mr. Vincent R. Perkins.

Hemiptera.—Mr. T. J. Bold and Mr. Perkins have been for some time past busily engaged in collecting the local species of *Hemiptera*, or Bugs, and they will be greatly obliged to any of the members who will assist them in collecting these insects on the days of the Field Meetings or otherwise. All specimens forwarded to them shall be correctly named, and kept at their captor's disposal, and any standing in old local collections shall be carefully examined and returned with the names attached.

XXXVI.—*Report of the Dredging Expedition to the Dogger Bank and the Coasts of Northumberland.* Edited by Henry T. Mennell.

At the meeting of the British Association in 1861, a grant was made for dredging on the coasts of Northumberland and Durham. The Natural History Society and the Field Club had already agitated the question, and applied to the Association for assistance. The gentlemen to whom the grant was made, two of whom (J. Gwynn Jeffreys, Esq., and the Rev. T. Hincks) were not connected with the district, therefore, very courteously consented that our local societies and naturalists should have the practical organization and control of the expedition. Assisted by the advice of Mr. Joshua Alder, the Rev. A. M. Norman, Mr. George Hodge, Mr. G. S. Brady, and other experienced dredgers, I engaged the steamer "Chesapeake," one of the "Red Star" line, purchased dredges and other necessary apparatus, and made all the arrangements which were requisite for the success of the expedition.

The two societies above named supplemented the grant of the Association, and many of their members also subscribed to the fund. The four gentlemen just named lent various apparatus, and Messrs. T. and W. Smith, J. Crawhall and Sons, and Haggie Brothers, liberally presented all the rope required for the dredges and nets.

Thus fitted out and provisioned, the "Chesapeake" got under way on the morning of the 20th of August, having on board the Rev. A. M. Norman, Mr. Tuffen West, F.L.S., and myself. Mr. Joseph Wright, the keeper of the Museum, accompanied us, and was, in a variety of ways, of great assistance to us. Mr. Hutchinson, of Whitburn, a fisherman who had had much experience under Mr. Alder, was engaged to superintend the dredges.

It may readily be imagined that at the outset of an expedition like this, there were many things to be remembered and much to be done at the last moment. Hence confusion reigned supreme

at the hour appointed for our departure, and it was past noon when we steamed over the bar, and felt at last assured that no further cause of delay could occur to the fertile imagination of the captain.

Our course lay east, with just a *soupçon* of south in it, and a couple of hours' run over a sea, smooth as a mill pond, brought us to ground some twenty miles from land, where we decided to try our tackle for the first time.

Here we worked with fair results for some time, finding a hard bottom, and about 25 to 35 fathoms water. The results as regards Mollusca, are recorded in the first column of the table which accompanies this report. As evening approached, we again got up steam, and ran the whole night due east. The early dawn found us eighty or one hundred miles from land, with a glassy sea and a ground swell disastrous to landsmen. We were hard at work by five o'clock, dredging in 20 to 25 fathoms water, on a soft oozy bottom, and thus continued all day, gradually working westward, the water varying from 20 to 35 fathoms, and the results of each haul often widely differing from its predecessor. Whether it was from enthusiasm for the work, or from more ignoble causes, I will not say, but certain it is that the breakfast hour, dinner time, tea and supper alike passed without being able to seduce us from the deck. Mr. West, the well-known and most able natural-history draughtsman, was hard at work with his microscope under circumstances of much difficulty, and his beautiful drawings of many of the zoophytes and other animals obtained, added interest and value to the results of the expedition.

That night the boat lay by, the setting sun dipped into a waveless sea, and the weather was all that a dredger could desire. The tide and currents tended to drift the boat eastward, and the dawn found us probably about as far from land as on the preceding morning. The dredges were again let down, and with intervals during which considerable way was made westward, we worked till afternoon. The results of these two days' work are recorded in the second column of the tables.

The depth of water shows that we never actually reached the

summit of the Dogger Bank, but that the dredging was confined to its westward slopes. Had the summit of the bank being gained, the lead would have shown a much less depth of water. It is however probable that the shallow waters on the bank, constantly agitated, and disturbing the sandy bottom, will not be found so favourable to animal life as the deeper and more tranquil slopes which we investigated. Another expedition must prove this.

The signs of the sky, as read by the experienced eye of Hutchinson, foretold a gale from the west, which was not long in coming to confirm his judgment. The boat was, therefore, turned landward, and with all the speed she was capable of, she ran towards her port. The night was a glorious one, and the comet was seen under peculiarly favourable circumstances. The boat's track, and the spray thrown off by the paddles, were brilliantly phosphorescent. The gale was, however, unpleasantly strong, and right in our teeth, placing our very extensive collection of bottles in some jeopardy, and upsetting our dishes of valuables in a decidedly unpleasant manner. Midnight found us in sight of Tynemouth Castle, and under its sheltering lee we laid by for the night. Next morning the wind, though much abated, was unfavourable for dredging, and after a few hours' work on the haddock ground, with little success, we abandoned the attempt, and ran for the Tyne, so finishing on Saturday afternoon our first cruise.

On Monday morning a much larger party assembled on board the "Chesapeake." Mr. Norman had left us, but in his place we had the Rev. H. B. Tristram, F.L.S., Messrs. G. S. Brady, H. B. Brady, F.L.S., Drewitt O. Brown, E. J. J. Browell, and Hugh Bowman, so that we had a party of eight besides our assistants. Much delay again occurred at starting. Our heavily laden boat ran aground in the river, and we were exposed for an hour to the jeers of countless crowds of pleasure seekers bound for the Tynemouth regatta. When at last we reached the bar, we found it sufficiently lively, and the fine fresh breeze and billowy sea did not appear very favourable for our objects. We ran, however, nearly due north, or a little to the east of it, and when approaching Warkworth attempted to work our dredges.

The loss of the greater part of one of these, and of a towing net, rewarded our labours, and we obtained little else but losses, so that in despair we ran into Warkworth, hunted over the marshes at the mouth of the river, where several interesting plants and animals were noticed, took tea at the inn, and returned on board to sleep.

We determined, if possible, to make up for the lost day, and at four o'clock next morning we steamed out of port, and found the sea much more calm and the wind abated. In the dusk of the early dawn, numberless fishing boats, and countless flocks of gannets were seen, one returning from, and the other setting out for, a raid upon the herrings then abundant on the coast. Two or three hours' run east by north brought us to good ground of large gravel and sand, in 25 to 35 fathoms water. Here we commenced work, and with good success continued our labours until afternoon, gradually working northwards. The views of the coast were of great beauty, Dunstanborough and Bamborough crowning with their towers their basaltic peninsulas, formed striking objects, and behind them rose the Cheviots, bold and clear. The sea was studded with French luggers, picturesque and dirty; numberless grampuses were seen tumbling and spouting around in every direction, and a-head of us were the Fern Islands, with their myriads of sea fowl. We ran the boat close in to one of the larger islands, whose fine perpendicular basaltic cliffs gave promise of deep water close to its shores.

Our near approach alarmed countless clouds of birds, which were for some time the objects of our interested observation. Thence we ran for Holy Island, and after trying a few scrapes with the dredge under its lee, we ran into Berwick for the night. Tweed salmon is always an interesting study to the Naturalist, and on this occasion it was not neglected. Early next morning we ran out of port, due east for about thirty miles, and worked hard all day, on excellent ground, of coarse sand and gravel, in 40 to 55 fathoms water, with great success; indeed, this was our best day's work. Towards evening we ran into Berwick again and took the train home, thus avoiding a somewhat tedious voyage of eighty or ninety miles. The results of these three

days' work are recorded in the third column. So ended our expedition, which was not without its results to science generally and greatly added to our knowledge of our local fauna. All the specimens obtained were very carefully preserved, and on the return of the boat were committed to several gentlemen competent in their various departments, to catalogue and report upon.

Special reports on each branch follow these general remarks, and obviate the necessity of further words from me. A tabular statement of the whole number of species obtained accompanies this paper.

Besides the scientific results, we may count as very valuable, the experience in and the taste for dredging acquired by a number of our members, and the consequent impetus given to investigations of this nature.

Report on the Mollusca. By Henry T. Mennell.

The number of species of Mollusca obtained on the expedition was 138, viz:—

Cephalopoda		1
Gasteropoda		66
Prosobranchiata	53	
Opisthobranchiata	7	
Nudibranchiata	6	
Lamellibranchiata.		60
Brachiopoda		—
Tunicata		11
		138

A full list of these accompanies my report, in which the comparative rarity of each species, and its occurrence in the three different localities dredged, are recorded.

This renders it only necessary for me to draw attention to a few of the more interesting species, and to add a few remarks suggested by a study of the list.

In the first place several species were obtained in such a con-

dition as to lead to the belief that they are derived from a post-pliocene bed, situated in Berwick Bay, about 25 miles from that town, in 40 to 50 fathoms water, a supposition confirmed by the fact that they have not been recorded as living inhabitants of our seas. These are

Murex erinaceus.
Margarita cinerea.
Mya Uddevallensis.
Astarte elliptica.
Saxicava sulcata.

In addition to these the following species were met with in the same locality, dead, and in such condition and in numbers so disproportionate to those found living, that it seems safe to conclude that they too exist in, although they do not exclusively belong to, the post-pliocene bed referred to, viz:—

Trophon clathratus.
Mangelia linearis.
Trevelliana.
turricula.
Natica nitida.
Trichotropis borealis.
Chenmitzia fulvocincta.
Turritella communis.
Rissoa cimicioides.
Trochus ————
Emarginula reticulata.
Puncturella Noachina.
Arca tetragona.
Venus casina.
Mya truncata.

Further to show the subarctic relations as regards present distribution, and glacial affinities as regards geological time, of the shells obtained, the former are distinguished in the list thus (*) and the latter thus (†). We find that of the 138 species in our list 32 are now living in Greenland, and 54 are met with in the glacial beds of these islands. For purposes of comparison

with the Greenland and glacial shells we might exclude from our list the smaller and critical genera of Odostomia, Rissoa, Eulimella, which have probably not been observed in either, and for comparison with the glacial we should of course omit the Nudibranchs and Tunicata, of which no remains can be found in the fossil beds. Then the larger percentage of subarctic and glacial species will be very evident. Of the species obtained 7 (†) were living at the period preceding the glacial, but disappeared during that age, hence they may be considered as more southern types, and their small number is striking.

Of the species recorded in the list, Eulima nitida, E. gracilis, and Rissoa cimicioides, are new to our local fauna; Syndosmya intermedia, not included in Mr. Alder's catalogue, has only been met with once previously by Mr. Howse. Margarita cinerea is, if fossil, (and there can, we think, be no doubt of it,) new to the English Pleistocene Fauna, having only hitherto been recorded from the Clyde and from the Antrim Turbotbank.

Several species recorded by Mr. Alder in his Catalogue of the Mollusca, published in our Transactions, as of great rarity, were met with in considerable abundance, *e.g.*, Trophon Barvicensis, Mangelia Trevelliana, Chemnitzia fulvocincta, Trochus milligranus, Puncturella Noachina, Lucina flexuosa, and Cardium punctatum. Of the rarer species met with in less abundance, the following may be noticed, Mangelia brachystoma, M. teres, Natica Grœnlandica, Eulimella Scillæ, Philine quadrata, Cylichna strigella, Pecten striatus, Crenella decussata, and Neæra brevirostris.

The large number of small species recorded in the third column is in part due to the fact that a quantity of the sand and mud obtained in Berwick Bay was taken home for examination. This I have subsequently searched with much care, and have thus added many species to the list which were unobserved on board. A careful examination of some parts of the Dogger Bank siftings, had, however, convinced us that it was not worth carrying home, and I have no doubt, that the genera Odostomia, Rissoa, Chemnitzia, and Eulimella are much more abundant in Berwick Bay than in the other localities which we dredged.

Among the Tunicata, the list of which has been drawn up by Mr. Joshua Alder, were several specimens of Cynthia glacialis, of Sars, a species now for the first time recorded as British; specimens had however been previously taken by Mr. J. Stanger, on our coast, which are noticed in our Transactions by Mr. Alder, under the name of C. vestita. He has since ascertained, however, that Professor Sars had got it on the Norwegian coast, and described it in 1858, under the name of C. glacialis.

MOLLUSCA.

CEPHALOPODA.

	1. Off Tynemouth.	2. Dogger Bank.	3. Coquet and Berwick Bay.	
Sepiola Rondeletii, *Leach*			r.	

GASTEROPODA.

† Murex erinaceus, *Linn.*			dead.	One very old specimen, at 50 fathoms, in Berwick Bay.
*† Trophon clathratus, *Linn.*	v.r.	r.c.	r.	Very fine on the Dogger, poor and rare elsewhere.
*† Barvicensis, *Johnston*		r.c.	v.r.	Ditto.
*† Fusus gracilis, *Da Casta*	r.c.	c.	r.c.	
propinquus, *Alder*	r.	c.	c.	
*† antiquus, *Linn.*		r.	r.	Small and poor.
Turtoni, *Bean*		v.r.	v.	A capsule, only in 30 fathoms.
*† Buccinum undatum, *Linn.*	r.	r.	r.	Small specimens of the common deep water var.
*† Nassa incrassata, *Müller*	r.	r.	r.	
Mangelia costata, *Pennant*			r.	A very few fine specimens.
brachystoma, *Philippi*		v.r.		One specimen only.
linearis, *Mont.*	r.	r.c.	r.c.	A white variety was obtained.
teres, *Forbes*			v.r.	Two fine specimens in Berwick Bay.

		1. (off Tynemouth.)	2. Dogger Bank.	3. Coquet and Berwick Bay.	
	Mangelia Trevelliana, Turton		v.r.	c.	
*†	turricula, *Mont.*	r.	r.c.	r.	Very fine on the Dogger, poor and small elsewhere.
†	Cypræa Europæa, *Mont.*			dead.	One specimen in 50 fathoms, Berwick Bay.
†	Natica nitida, *Donovan*	r.c.	r.	r.c.	
	Montagui, *Forbes*	r.c.	r.	r.c.	
*†	Grœnlandica, *Beck.*		v.r.		Three specimens.
*†	Velutina lævigata, *Linn.*		v.r.	r.	
*†	Trichotropis borealis, *Brod.*		v.r.	c.	Commonestinthegreatest depths dredged.
	Odostomia insculpta, *Mont.*			v.r.	
	interstincta, *Mont.*			r.	
	spiralis, *Mont.*			r.	
	turrita, *Jeff.*			v.r.	
	unidentata, *Mont.*			v.r.	
	Eulimella Scillæ, *Scacchi*			v.r.	
	acicula, *Phil.*		v.r.	r.	
	Chemnitzia fulvocincta, *Thomp.*		r.c.	c.	
	indistincta, *Mont.*			r.	This shell appears to be inseparable from Odos. interstincta.
	Eulima distorta, *Deshayes*			r.	
	gracilis, *Deshayes*			r.	
	bilineata, *Alder*		v.r.	r.c.	
	nitida, *Alder*			r.	
†	Aporrhaïs pes pelicani, *Linn.*	r.		r.	
†	Turritella communis, *Risso*	r c.	r.	c.	Two or three specimens of the white variety.
	Scalaria Trevelyana, *Leach*		r.	r.c.	
	Rissoa inconspicua, *Alder*			v.r.	
	punctura, *Mont.*	v.r.			
	cimicioides, *Forbes*			v r.	One living and several dead specimens, in 40-50 fathoms, in Berwick Bay.
‡	striata, *Mont.*	v.r.			

		1. Tynemouth.	2. Dogger Bank.	3. Coquet and Berwick Bay.	
	Rissoa ulvæ, *Pennant*				Very common about Warkworth Harbour.
	Trochus millegranus, *Phil.*			c.	
	Montagui, *Gray*			r.	
†	tumidus, *Mont.*	v.r.		r.c.	
†	zizyphinus, *Linn.*	r.		r.	Dredged in both localities in shallower water and nearer the shore than the limits stated in the introductory remarks.
*†	Margarita cinerea, *Couthoy*			dead.	Several specimens in 40 fathoms in Berwick Bay.
*†	Emarginula reticulata, *J. Sow.*			c.	
*†	Puncturella Noachina, *Linn.*		v.r.	r.c.	
†	Pileopsis Hungaricus, *Linn.*			r.	Very small specimens.
*†	Dentalium entale, *Linn.*	r.	v.c.	c.	
	Chiton asellus, *Chemn.*		v.r.	c.	
‡	Tornatella fasciata, *Linn.*		r.	v.r.	
	Bulla Cranchii, *Leach.*			v.r.	
‡	Cylichna cylindracea, *Penn*		r.		
	strigella, *Loven*			v.r.	One specimen only.
	umbilicata, *Mont.*		v.r.	v.r.	
	Bullæa quadrata, *S. Wood*		r.		
*	scabra, *Müller*		v.r.	v.r.	
	Idalia aspersa, *A. and H.*	r.			
	Tritonia plebeia, *Johnston*	r.		r.	
*	Dendronotus arborescens, *Müll.*	r.			
	Eolis coronata, *Forbes*	r.			
	Drummondii, *Thompson*	r.			
	rufibranchialis, *Johnston*		r.c.		Very large and richly coloured.

LAMELLIBRANCHIATA.

*†	Anomia aculeata, *Müller*		r.	r.	
†	ephippium, *Linn.*	r.			
†	Pecten opercularis, *Linn.*	r.	r.	r.	
†	pusio, *Pennant*			r.	

		1. Off Tynemouth.	2. Dogger Bank.	3. Coquet and Berwick Bad	
	Pecten similis, *Laskey*			c.	
	tigrinus, *Müller*	v.r.		c.	
	striatus, *Müller*			v.r.	One specimen only.
‡	Lima Loscombii, *Sowerby*			r.c.	
*‡	subauriculata, *Mont.*			dead.	
*†	Modiola modiolus, *Linn.*		r.c.		
	phaseolina, *Philippi*			v.	
*	Crenella decussata, *Mont.*			r.	
*	nigra, *Gray*		r.	v.r.	
*	marmorata, *Forbes*			r.	With T. zizyphinus.
	Arca tetragona, *Poli.*			dead.	
	Nucual nitida, *Sow.*			r.	
†	nucleus, *Linn.*		v.r.	r.	
*†	tenuis, *Mont.*		r.c.	r.	
	Leda caudata, *Dow*	v.	r.c.	v.c.	
†	Cardium echinatum, *Linn.*	r.			
	fasciatum, *Mont.*			r.c.	
*	punctatum, *Bracchi*		r.	r.c.	
*	Lucina borealis, *Linn.*	r.		r.	
*†	flexuosa, *Mont.*		v.r.	r.	
‡	Kellia suborbicularis, *Mont.*	r.		r.	
†	Montacuta bidentata, *Mont.*	r.		r.	
‡	substriata, *Mont.*		v.c.	r.	On Spatangus purpureus.
	ferruginosa, *Mont.*	r.		r.	
*†	Cyprina Islandica, *Linn.*	r.			Young specimen only.
*†	Astarte compressa, *Mont.*	c.	v.c.	c.	
*†	elliptica, *Brown*			dead.	
*†	sulcata, *Da Costa*	c.	c.	c.	
*†	var. Scotica	r.c.	r.c.	r.c.	
	triangularis, *Mont.*			v.r.	
†	Venus casina, *Linn.*			dead.	
†	fasciata, *Dou*			r.	
†	ovata, *Pennant*	r.	r.	c.	
†	striatula, *Don*	r.c.			
	var. Prideauxeana, *Leach*	r.c.		r.	
†	Artemis exoleta, *Linn.*	r.			
†	lincta, *Pult.*	r.		r	
	Lucinopsis undata, *Penn.*			r.	

		1. Off Tynemouth.	2. Dogger Bank.	3. Coquet and Berwick Bay.	
†	Tapes virginea, *Linn.*			r.c.	
	Mactra elliptica, *Brown*	r.	r.	r.	
†	solida, *Linn.*	r.			
†	subtruncata, *Da Costa*	r.		r.	
	Tellina pygmæa, *Philippi*			r.c.	
†	Psammobia Ferroensis, *Chemn.*	r.		r.	
	tellinella *Lam,*			v.r.	
†	Syndosmya alba, *Wood*	v.r.			
†	intermedia, *Thomp.*		v.r.		Two specimens.
†	prismatica, *Mont.*	r.			
	Solen pellucidus, *Penn.*	r.		r.	
*†	Mya arenaria, *Linn.*	r.			
*†	truncata, *Linn.*	r.	r.	dead.	Young only, except the dead specimens.
*†	Uddevallensis			dead.	
†	Corbula gibba, *Davi*	v.r.			
	Neæra brevirostris	v.r.			
*†	Saxicava rugosa, *Linn*	r.c.	r.	r.c.	
*†	sulcata, *Smith*			dead.	
	Thracia phaseolina, *Lam.*	r.			
	villosiuscula, *Macg.*	r.			
	TUNICATA.				
	Polyclinum———	r.			Specimens not preserved.
	Botryllus———	r.			Do.
	Clavelina lepadiformis, *O.F.Müll.*			r.	
	Ascidia intestinalis, *Linn.*		r.c.	r.c.	
	parallelogramma, *O.F.M.*		r.c.		
*	conchilega, *O. F. Müll.*		r.c.		
	sordida, *A. & H.*		r.		
	Molgula arenosa, *A. & H.*	c.	c.	c.	
	Cynthia glacialis, *Sars*			r.	
	coriacea, *A. & H.*		r.		
	grossularia, *Van Bened.*		r.c.	r.c.	

Report on the Crustacea. By the Rev. A. Merle Norman, M.A.

One hundred and one Crustacea were obtained.

To this number two or three more Entomostraca may yet be added, when the gatherings of the drift net shall have been more minutely examined. The sectional distribution of the species may be thus shown :—

Brachyura . .	9.	Amphipoda . .	34.
Anomoura . .	7.	Isopoda . . .	5.
Macroura . . .	7.	Entomostraca. .	16.
Stomapoda . .	8.	Pycnogonoidea .	10.
		Cirripedia. . .	5.

The object of the present paper is to give a catalogue of the species obtained; a few notes on the rarer forms, and descriptions of the new Stomapods. The description of the new Amphipoda and Entomostraca must be deferred for the present. Mr. Hodge, who is especially devoting himself to the study of the Pycnogonoidea, will report upon the species of that very interesting order.

In the following table the three columns represent the same localities as those in the report on the Mollusca :—

Stenorhynchus rostratus, *Lin.*			r.c.	
Inachus Dorsettensis, *Penn.*			r.	A few young specimens obtained off Berwick Bay. New to our local Fauna.
——— dorhynchus, *Leach*	r.			One smallexampleonly.
Hyas coarctatus, *Leach*	c.	c.	c.	The most abundant of the larger Crustacea, in deep water.
Portunus holsatus, *Fabr.*	r.c.		r.c.	Specimens small.
——— pusillus, *Leach*		r.	r.	
Ebalia tuberosa, *Penn.*	r.c.		r.c.	
———Cranchii, *Leach*		r.	r.	
Atelecyclus septemdentatus, *Mont.*			r.	Only very young.
Pagurus Bernhardus, *Lin.*	c.	c.	c.	
———Hyndmanni, *Thompson*	v.r.			One only, east of Tynemouth.
———lævis, *Thompson*	r.c.	c.	c.	Sandy ground.

Pagurus Thompsoni, *Bell*	c.	c.	c.	With the last, and also on harder ground.
Porcellana longicornis, *Penn.*			r.	
Galathea dispersa, *Bate*	r.c.		c.	Widely diffused.
———Andrewsii, *Kinahan*	r.		c.	
Crangon Allmanni, *Kinahan*	c.	c.	c.	Abundant.
———spinosus, *Leach*	v.r.		r.c.	A very large example taken off Berwick.
———bispinosus, *Westwood*		v.r.		Two specimens of this rare species dredged in 40 fathoms, 40-50 miles east of Tynemouth.
Hippolyte pusiola, *Kroyer*	v.c.		r.	
——— securifrons, *Norman*		r.	r.c.	
Pandalus annulicornis, *Leach*	c.	c.	c.	Abundant everywhere.
——— Thompsoni, *Bell*	c.		r.c.	
Mysis spiritus, *Norman*	v.c.	c.	r.	
———Didelphys, n. sp.	v.c.			A new species.
Diastylis Rathkii, *Kroyer*	r.		r.	
Vaunthompsonia cristata, *Bate*		r.		50-60 miles east of Tynemouth.
——— rosea, n. sp.		v.r.		A new species.
Eudora truncatula, *Bate*		r.		50-60 miles east of Tynemouth, on a muddy bottom.
Cyrianassa ciliata, n. sp.		v.r.		A new species.
———elegans, n. sp.		v.r.		A new species.
Montagua Alderii, *Bate*	r.			40-50 miles off Tynemouth.
——— pollexiana, *Bate*	c.		r.c.	
Callisoma crenata, *Bate*	v.r.			One specimen, 7 miles off Tynemouth, 25 fathoms, and a second off Berwick.
Anonyx Edwardsii, *Kroyer*	r.	v.r.		40 and 100 miles east of Tynemouth.
———ampulla, *Kroyer*		v.r.		Only a single example.
———denticulatus, *Bate*	r.c.		r.	
———longipes, *Bate*		v.r.		One specimen only.
Ampelisca Belliana, *Bate*	c.	r.	r.c.	
——— Gaimardi, *Kroyer*	c.	c.	c.	
Haploops tubicola, *Lilj.*	v.r.		v.r.	A genus new to Britain.
Phoxus plumosus, *Holböll*	r.	r.		
Œdicerus parvimanus, *B. and W.*		v.r.		

Kroyera altamarina, *Bate and Westw.*		v.r.		
Iphimedia obesa, *Rathke*	c.	r.c.		
Acanthonotus Owenii, *Bate*	c.	r.c.	c.	This fine Amphipod was abundant and widely diffused.
Dexamine Vedlomensis, *Bate and Westw.*	r.c.		v.r.	40-50 miles off Tynemouth, and also off Berwick.
Atylus bispinosus, *Bate*	vr.			Seven miles off Tynemouth, one specimen.
Calliope bidentata, n. sp.	v.r.	v.r.		A new species.
Eusirus Helvetiæ, *Bate*		v.r.		
Microdeutopus anomalus, *Rathke*	v.r.		r.	Seven miles off Tynemouth, and also off Berwick.
Melita proxima, *Bate*		v.r.		One dredged 100 miles off shore.
Eurystheus erythrophthalmus, *Lilj.*			v.r.	A single imperfect specimen.
Megamœra Alderi, *Bate*		v.r.		100 miles off Tynemouth, 25-30 fathoms, one specimen.
——longimana, *Leach*			v r.	
——Othonis, *Edwards*			v.r.	
Heiscladus longicaudatus, *Bate and Westw.*	r.			
——brevicaudatus, n. sp.	v.r.			A new species.
Cerapus difformis, *Edwards*	r c.	r.	r.c.	
Siphonæcetes——	v.r.			One specimen 7 miles off Tynemouth, probably new.
Nænia caudadentata, n. sp.			v.r.	A new species.
Proto Goodsirii, *Bate*	v.r.			One only, 40-50 miles off Tynemouth.
Caprella linearis, *Latr.*	v.r.			
——lobata, *Müller*	r.			
Protella phasma, *Latr.*	c.		r.c.	
Arcturus longicornis, *Low*	c.	r.c.	c.	
——intermedia, *Goodsir*	r.			
——gracilis, *Goodsir*	r.c.		r.	

Phryxus longibranchialis, n. sp.	v.r.			A new species found in *Pagurus Thompsoni*,
Oniscoda Deshayesii, *Lucas*	r.		r.	
Nebalia bipes, *O. Fab.*	v.r.			One specimen, 7 miles off Tynemouth, muddy bottom.
Evadne Nordmanni, *Loven*	c.	c.		Pelagic.
Cythere acuta, *Baird*			r.c	A rare species which I have never before met with.
——— pellucida, *Baird*			r.c.	
——— quadridentata, *Baird*		r.c.	r.	
——— obesa, n. sp.			c.	A new species.
——— limicola, n. sp.			r.c.	A new species.
——— ——— n. sp.			r.	New to science, if it be not identical with a Tertiary Fossil species, combining characters of *C. viridis* and *C. flavida.*
——— contorta, *Norman*		r.		
Cythereis fimbriata, *Rœmer*		r.		Living specimens. The species was admitted into our Fauna on the evidence of two or three single valves taken in the Firth of Clyde.
Cypridina Brenda, *Baird*	r.c			Synonymous with *C. globosa, Lilj.*, and *Assterope Grœnlandica, Fischer*, dredged 40-50 miles off Tynemouth, on a muddy bottom.
Ichthyophorba hamata, *Lilj.*	r.c.	r.c.		Pelagic. A genus new to Britain.
Anomalocera Patersonii, *Thomp.*	r.c.	r.c.		Pelagic.
Caligus curtus, *Müller*	c.	c.		On cod and coal fish. This is *C. Mülleri, Leach*, and *C. diaphanus, Baird*, but probably not *C. diaphanus, Kroyer.*

Caligus rapax, *Edwards*		c.	On cod.
Anchorella uncinata, *Müller*		r.	On cod.
Balanus porcatus, *Da Costa*	r.c.	r.	Small specimens.
———crenatus, *Brug*		r.c.	
———Hameri, *Ascan*		r.	Small specimens.
Verruca Stromia, *Müller*	c.		
Scalpellum vulgare, *Leach*	c.		On sertularian zoophytes

Family. **Palæmonidæ.**

Subfam. ALPHEINÆ, *Dana.*

Genus. HIPPOLYTE, *Leach.*

Hippolyte securifrons, *Norman.* (Pl. XII. fig. 1-7.)

Hippolyte securifrons, Norman. *Brit. Assoc. Report*, 1861.

Cephalothorax gibbosus, carinatus, atque dentatus; dentes marginem tertiâ cephalothoracis parte posteriorem non attingentes. Rostrum altum, truncatum, securiforme, squaman antennalem non superans; dentes marginis superioris 6-13, simplices; quorum 2-4 in cephalothoracis carinâ siti, et 3-5 ad rostri extremitatem in senioribus minuti, in junioribus evanescentes. Margo cephalothoracis anterior quatuor aculeorum paribus armatus, duobus supra oculos, tertio infra oculos, quarto ad junctionem marginis anterioris cum marginibus lateralibus. Antennæ interiores perbreves. Segmentum abdominale tertium pone vix productum. Telson tribus vel quatuor aculeorum lateralium paribus, et sex aculeis terminalibus instructum.

This species—the finest British *Hippolyte*—was first dredged by Mr. Jeffreys and myself in the summer of 1861, in seventy or eighty fathoms water, about sixty miles east of Shetland, and was briefly characterized in a paper read at the Manchester meeting of the British Association. During the recent dredging off this coast, several examples of *H. securifrons* were obtained between fifty and sixty miles east of Tynemouth, and also in Berwick Bay; and still more recently a specimen has been sent to me which was pro-

cured by Mr. G. S. Brady, from a fishing boat at Sunderland. I have thus arrived at a far more accurate knowledge of its character, than could be obtained from the original type, and find that an extraordinary range of variation in the form and toothing of the rostrum must be allowed to the species.

The colouring of *H. securifrons* is most gorgeous—brilliant crimson spotted with canary yellow.

The carapace, which is very deep and gibbous, has its front margin armed with four pairs of spines;* two of these are placed together above the eyes, and near the base of the rostrum; a third is situated immediately below the eyes and the fourth at the angle formed by the junction of the anterior and lateral margins.

The rostrum in the mature animal assumes the form of a deep, flattened, hatchet-shaped plate, ending in a strong tooth; the carapace is also keeled and toothed above, through two-thirds of its length. The variation in the armature of the rostrum will be best understood by the description of several examples selected on account of their difference in size.

Number 1 was the largest specimen obtained, which measured two inches and a quarter long, while the total length of the smallest specimen, number 9, scarcely exceeded three-quarters of an inch.

1. $\frac{13}{5}$; 4; 4 and 5—that is 13 teeth on the upper side of the rostrum, and five on the lower; 4 of the 13 upper teeth situated on the carapace; the widest space between any two teeth is between the 4th and 5th. (Pl. XII., figs. 1, 2.)
2. $\frac{11}{2}$; 4; 4 and 5. (Pl. XII., fig. 3.)
3. $\frac{10}{2}$; 3; 4 and 5. (Pl. XII., fig. 4.)
4. $\frac{11}{4}$; 4; 4 and 5. (Pl. XII., fig. 5.)
5. $\frac{10}{3}$; 4; 4 and 5.
6. $\frac{9}{2}$; 4; 4 and 5; young.
7. $\frac{10}{4}$; 4; 5 and 6; young.
8. $\frac{8}{3}$; 3; 3 and 4; young.
9. $\frac{6}{3}$; 2; 3 and 4; young. (Pl. XII., fig. 6.)

* In the Brit. Assoc. Report it was erroneously stated that there were three pair only. Two spines, however, instead of one, are usually present above the eye; though in one instance I could not detect the second spine in that position.

It will be observed, first, that the proportionate depth of the rostrum becomes greater as the animal approaches maturity, and secondly, that although the number of teeth on the upper side of the rostrum increases with age, no such increase takes place with regard to those of the lower surface.

The tip of the rostrum, the short interior antennæ, the scale of the exterior antennæ, and the extremity of the pedipalps are all of nearly equal length. The first feet are stout, of moderate length, a little exceeding half the length of the second pair. The wrist of the second feet is divided into seven articulations.

The posterior margin of the third abdominal segment is but little produced, so slightly indeed that the central lobe would scarcely be noticed unless it was especially looked for.

The telson (Pl. XII., fig. 7) is armed with three (rarely four) pair of spines on its surface, and ends in six spines, the two central and two outer of which are short and blunt, the two intermediate considerably longer.

H. securifrons approaches more nearly to *H. spinus* (Sowerby) than to any other of our recognised species. The latter may be more especially distinguished from the former; *first*, in having the dentated keel continued to the hinder margin of the carapace; *secondly*, in the four posterior teeth being of considerably greater size than the teeth anterior of them; *thirdly*, in the fact that the teeth in the upper margin of the rostrum are themselves furnished with secondary teeth; and *fourthly*, in having the dorsal centre of the third abdomenal segment produced backwards into a conspicuous tooth-like process.

It is not improbable that some of the Hippolytes which have been considered by our collectors to be *H. spinus*, more properly belong to this species. I have figured Pl. XII., fig. 8, the rostrum of *H. spinus*, dredged by me at Oban, for comparison with the rostra of the present species.

The examination of the specimens of *H. securifrons*, from this coast, has proved the extent of variation in this species to be so great that possibly it may hereafter prove to be identical not only with *H. turgida* of Kroyer, but also with *H. Phippsii* of the same author.

FAMILY. **Mysidæ.**

SUBFAM. MYSINÆ, *Dana.*

GENUS. MYSIS, *Latr.*

MYSIS DIDELPHYS,* n. sp. (Pl. XII., figs. 9-11.)

M. vulgari affinis at robustior; squamâ antennali paullo latiore, subellipticâ, non spinâ acuta sed tribus ciliis plumosis confectâ; telsone aculeis utrinque paucioribus, fere decem, apiceque bispinoso, (nullis spinulis minutis sicut in *M. vulgari* interpositis,) armato.

A short and robust species, with immense eyes on short footstalks. The configuration of this species reminds us of *M. oculata* (O. Fab). Carapace short, leaving the three posterior thoracic segments, and the dorsal portion of the fourth uncovered, and having in front a very short, but acute rostrum. Diameter of the cornea of the eyes fully equalling, if not exceeding their total length. Antennæ, short. Peduncle of interior antennæ scarcely exceeding the length of the eye. Antennal scale shortly lanceolate or subelliptical (Pl. XII., fig. 10), about twice the length of the eye, fringed with plumose cilia all round its margins; having a short second joint (Pl. XII., fig. 11), which is furnished with five cilia, one being situated on each side and three at its termination.

Telson (Pl. XII., fig. 9), entire, one fourth shorter than the intermediate laminæ of the tail, with about ten teeth on each margin; these teeth are distributed through nearly the entire length of the telson; and the greatest interval between any two teeth is between the fourth and fifth. It will be noticed that in the type specimen there is an irregularity in the armature of the telson, which has eleven teeth on one side but only ten on the other. The telson terminates in two large teeth, one of which is situated at each angle of the apex; there are no smaller secondary teeth between these. The external caudal laminæ are considerably longer than the internal, and have all the margins ciliated.

* *Didelyphys* the Opossum. This and the three following species were briefly described by the author in a paper read before the British Association at Cambridge.

Total length nine tenths of an inch.

The type specimen was dredged in deep water, forty miles off Tynemouth. Within the last few weeks I have had the opportunity of examining another specimen which was taken by Mr. Jeffreys in the Shetland Seas. This specimen which in all respects agreed with that dredged on this coast was sent to me for examination by Mr. Spence Bate, in whose collection it is preserved, and who had attached to it a MS. name, unaware that I had characterized this species at the meeting of the British Association this autumn.

Mysis didelphys is a much stouter species than *M. vulgaris*, to which it is nearly allied. The antennal scale is less produced, and the second joint much shorter and terminates in three cilia instead of in an acutely pointed spine. The telson is also shorter, with fewer lateral spines, and has not the two intermediate apical spines, which are present in *M. vulgaris*. *Mysis didelphys* is found in the open sea at a considerable distance from the coast, while the habitat of *M. vulgaris* appears to be invariably the brackish waters of estuaries and salt marshes.

Family. **Diastylidæ.**

This curious and abnormal family was well represented by *Diastylis Rathkii* (Kroyer), *Eudora truncatula* (Spence Bate), *Vaunthompsonia cristata* (Spence Bate), and the three following species, which do not appear to have been hitherto described.

Genus. VAUNTHOMPSONIA, *Spence Bate.*

Vaunthompsonia rosea, *n. sp.* Pl. XIII., figs. 1-3.

Vaunthompsonia elongata, flavescens maculis roseis minutis numerosissimis picta; segmenta quinque thoracis posteriora a cephalothorace nudata; pedes abdominales nulli; telson elongatum, appendicum caudalium exteriorum pedunculo par longitudine, spinis septem terminalibus, duobusque utrinque gracilibus armatum; appendicum caudalium pedunculus interne spinosulus; ramus interior triarticulatus interne spinosulus; ramus exterior biarticulatus paucis ciliis simplicibus instructus.

In general form this species is considerably attenuated; the abdomen more especially being much produced. The carapace is short, and in length but little exceeds its breadth. The frontal and lower margins are well rounded, and not furnished with any spines or toothed processes. The five posterior thoracic segments are uncovered by the carapace.

The superior antennæ, which consist of a three jointed peduncle, and two two-jointed sparingly ciliated filaments, are equal to about half the carapace in length.

The first thoracic feet are very long and slender, projecting considerably in advance of the head; the second legs are also of considerable length. The fourth and fifth pairs of thoracic feet are not furnished with any secondary member or palp. The fifth or last thoracic feet (pl. XIII., fig. 3), have the first joint very short, and not so long as broad. The second joint is four or five times as long as broad, with two small but strongly plumose cilia on the hinder margin, and three similar cilia on the front margin. The third joint is not so long as broad, furnished with two short strongly plumose cilia, and two whip-cilia in front of the fourth joint, which is twice as long as broad, has three whip-cilia on its front margin. The fifth joint, which is equal in length with the preceding one, has a single whip-cilium* in front, two plumose cilia behind, and two long whip-cilia attached to the postero-distal extremity. The sixth joint is much narrower than the fifth, and about half its length; its extremity gives rise to a long whip-cilium, and the seventh joint is in the form of a produced nail.

There are no abdominal feet.

The telson is well developed and of considerable size, being half as long again as the sixth abdominal segment, and equal in length to the peduncle of the lateral caudal appendages. It is furnished with two pair of long slender spines on its sides, and has the extremity beset with seven shorter and sub-equal spines.

* I have employed this term to designate a peculiar kind of cilium, which forms a characteristic feature in the garniture of the legs of the *Diastylidæ*. A "Whip-Cilium" is a long cilium, in which its basal portion is simple but the terminal half annulated or closely multarticulate (pl. XIV., fig. 4a.) These cilia are for the most part not plumose; occasionally, however, the basal inarticulate portion is fringed with hair, and more rarely the cilium is plumose throughout its entire length

The peduncle of the external caudal appendages is armed with a row of short equal spines, along its inner margin.

The inner and upper branch is three-jointed; the first joint with a row of short equal spines along the inner margin, and two or three longer spine-like cilia, on the outer edge; the second joint is half the length of the first, spined on the inner, and with a single very small cilium on the outer edge; the third joint measures about half the length of the second, and ends in two very minute cilia. The outer and lower branch is two-jointed; the first joint is two thirds the length of the first joint of the under branch, and the second joint longer than the first, and reaching to the distal extremity of the second joint of the inner branch; both joints bear a few long, spine-like cilia on their margins, and the second terminates in four long, spine-like plumose cilia.

Total length, a little less than half an inch.

Dredged on soft ground 50 to 60 miles east of Tynemouth.

This species is at once distinguished from *Vaunthompsonia cristata* and *Edwardsii*, and also from the nearly allied *Cuma scorpioides and Iphithoe trispinosa* by the large telson.

Genus. CYRIANASSA, *Spence Bate.*

Cyrianassa ciliata, n. sp. Pl. XIII., figs. 4-9.

Duo priora abdominis segmenta pedibus natatoriis instructa. Antennæ inferiores longissimæ. Telson brevissimum tertiam pedunculi appendicum caudæ lateralium partem haud superans, rotundatum, inarmatum. Pedunculus appendicum caudæ lateralium interne ciliatus, ciliis plumosis; ramus interior biarticulatus ciliis spinisque dense obsitus, extremitate fortiter unguiculatâ; ramus exterior uniarticulatus, planus, ciliis longissimis, annulatis atque plumosis instructus.

The carapace is slightly hispid, truncate in front, and furnished with a toothed process at the antero-lateral margin.

The antennæ, as in the genus generally, are remarkable for their very great length.

Five segments of the thorax are uncovered by the carapace.

The first feet (Pl. XIII., fig. 4), have the first joint curved forwards, and three to four times as long as broad, with the posterior margin as well as the proximal half of the anterior margin fringed with plumose cilia; there is also a spine near the distal extremity of the anterior margin; the second, third, and fourth joints incline backwards, the second has the anterior, and third and fourth both margins beset with plumose cilia, these three joints are short, and taken together are only equal in length to the first. The fifth joint is equal to the fourth, and has only a single plumose cilium at the distal extremity of the anterior margin. The sixth segment has an oblique palm which is furnished with a tuft of numerous long, slender, and slightly curved spines. The secondary member of the leg, or palp, together with its expanded basal joint scarcely exceeds in length the first joint of the leg itself.

The fourth foot (Pl. XIII., fig. 5), is stout and strongly built, and is furnished with a palp which equals itself in length. The first three joints are furnished with one or two plumose cilia, the second and third having also one or two small spines on the anterior margin. The fourth joint has the postero-distal extremity provided with three or four long whip-cilia. The fifth joint terminates in two long whip-cilia.

The fifth foot (Pl. XIII., fig. 6), has the first joint very long,—equalling half the total length of the leg—and furnished with four plumose cilia on the posterior margin, and one at the distal extremity of the anterior margin. The second joint, which is very short, has a single plumose cilium on the front margin. The third joint resembles very nearly the second. The fourth joint, which is also very short, has two minute spines, situated anteriorly, and three whip-cilia having their basal portions plumose attached to the postero-distal extremity. The fifth joint terminates in two whip-cilia.

The telson (Pl. XIII., fig. 6), is very short, scarcely one third of the length of the peduncle of the lateral caudal appendages, and has the extremity rotunded and unarmed.

The peduncle of the lateral caudal appendages has the inner margin clothed with an intermixture of spines and cilia which

have one of their margins only plumose. The interior branch is two-jointed; the first joint has the entire length of the inner margin edged with spines of unequal length, and also some cilia of the same character as those of the peduncle on the basal half, there are likewise a few plumose cilia on the outer margin; the second joint is half the length of the first; spined like it on the inner margin, and terminates in a strong, sharp, claw-like spine, from the outer base of which springs a long simple cilium which reaches considerably beyond the extremity of the claw. The exterior branch is in the form of a flattened oar-like blade, having the inner margin gradually rounded off to meet the outer. It slightly exceeds the length of the first joint of the interior branch and appears to consist of a single joint, although, at about one-third of its length there is an indication of a diagonal division across half of its breadth. The inner margin and apex are densely clothed with numerous and very long cilia. These cilia (Pl. XIII. fig. 8, 8*a*) are of a very remarkable character, having the shaft multi-articulate or annular, and the margins plumose. The outer margin of the exterior branch has a few much smaller cilia.

The structure of the shell consists of numerous little semi-circular plates, which are granular on their surface, and overlap each other like the tiles of a house (Pl. XIII., fig. 9).

There are two pair of abdominal feet. Each foot consists of a large and broad basal joint ciliated on the inner edge, and two rami, the inner of which is one jointed, and the outer two jointed; both furnished with very long plumose cilia.

Length, six tenths of an inch, without the antennæ.

Dredged in deep water off Tynemouth.

CYRIANASSA ELEGANS, *n. sp.* (Pl. XIV., fig. 1-6).

Abdominis segmenta tria priora pedibus natatoriis instructa Antennæ longissimæ. Telson elongatum, spines octo (duobus centralibus subtilissimè ciliatis) terminalibus, spinâque gracili utrinque infra medium sitâ ornatum. Appendicum caudalium pedunculus inarmatus; rami ambo sparsè spinosuli.

The exterior antennæ (Pl. XIV., fig. 1) are very long. The last joint of the peduncle is large and cylindrical, and has the inner half girt with numerous semicircles of fine cilia (Pl. XIV., fig. 1*a*). The filament is of very great length and remarkably slender.

The fourth pair of thoracic legs (Pl. XIV., fig. 3) are slender, and have the basal joint equalling half the length of the leg, with two or three minute cilia on the posterior border, and one towards the distal extremity of the anterior border. The second joint is very short, with a plumose cilium on each border, and also two long whip-cilia in front. The third joint has three whip-cilia in front. The fourth a minute whip-cilium in front, and two small spines on the posterior margin, from the distal extremity of which there also proceed two long whip-cilia. The fifth joint terminates posteriorly in a long whip-cilium, and anteriorly in a long two jointed spine, which is the sixth joint. The second member or palp is as long or nearly so as the leg itself.

The last thoracic legs (Pl. XIV., fig. 4) are slender, having their first joints four times as long as broad, with two plumose cilia on the posterior, and one on the anterior margin. The second joint, which is broader than long, is furnished with two whip-cilia on the anterior margin. The third is three times as long as broad, with two whip-cilia in front. The fourth, fifth, and sixth joints closely resemble those of the preceding pair, but are more slender.

There are three pairs of abdominal feet, which are appendages of the first three segments. Each of these feet, consists of a large oblong basal joint (Pl. XIV., fig. 5) and two branches. The inner branch consists of a single joint furnished with eight plumose cilia, and having on the outer margin a curious little nipple-like process with a slightly cleft extremity. The outer branch is two jointed, the last of which terminates in six long plumose cilia.

The telson (Pl. XIV., fig. 6*a*) is large and produced, equalling in length the peduncle of the lateral caudal appendages, and is armed with a spine on each side, and with eight spines set round the extremity. The two centre and the two outer of these spines are the longest, and the two centre under a high power of the microscope are found to be very finely ciliate on the edges.

The peduncle of the caudal appendages (Pl. XIV., fig. 6*b*) is slender and not furnished with either spines or cilia. The rami are equal in length to the peduncle, the inner three jointed, the outer two jointed. The first joint of the inner ramus is longer by one-third than the corresponding joint of the outer ramus, but on the other hand, the second joint of the inner ramus is shorter by one-third than the second joint of the outer, and thus the two joints of both rami taken together are nearly equal. The first joint of the inner ramus has two or three minute spines on the exterior margin, and two slender spines at the distal extremity of the inner margin; the second joint has about four slender spines on the inner margin, but none on the outer; the third joint is tipped with a minute cilium. The first joint of the outer ramus has two slender spines, and both margins of the second joint have three or four slender spines.

Taken 100 miles east by north from Tynemouth, in 20-25 fathoms, sand.

We have yet much to learn respecting the Diastylidæ. We know little of what must be considered generic characters among these Sessile-eyed Stomopods, still less what are to be regarded as sexual, and what as specific distinctions. The generic characters ascribed by Mr. Spence Bate to *Vaunthompsonia* or *Cyrianassa* will require much revision, so as to embrace the species described in the present paper. In the allied family of the *Mysidæ* considerable difference is found to exist in the conformation of the abdominal legs of the sexes. Judging from analogy, therefore, we may predict that a sexual divergence in these organs exists among the *Diastylidæ*. On the other hand, as I have found that the telson and caudal appendages supply valuable and constant specific characters among the *Mysidæ*, I have chosen these organs together with the posterior thoracic feet as the bases of the specific character among the Diastylidæ. It may be thought that the descriptions of these parts in this paper are unnecessarily prolix, but taking into consideration our present deficiency of knowledge respecting these Crustacea, it has been deemed that prolixity is a fault on the right side.

Cyrianassa elegans is easily distinguished from the other forms

described *C. ciliata* with its short telson approaches more nearly to Mr. Spence Bate's two species, but the description of these latter forms are so brief, that we have no means of judging how far *C. gracilis* and *C. longicornis* agree with *C. ciliata*. The known species of Cyrianassa may, however, be thus separated:—

C. elegans, Norman. Telson produced. Abdominal feet, three pairs.

C. gracilis, Spence Bate. Telson very short. Abdominal feet, five pairs.

C. ciliata, Norman. Telson very short. Abdominal feet, two pairs.

C. longicornis, Spence Bate. Telson very short. Abdominal feet, one pair.

It must be understood that the foregoing Catalogue has reference to the Crustacea exclusively as regards the particular expedition to which it refers; and that many species here recorded as r., are abundant in other localities off our coast.

Crangon Allmanni (Kin) was dredged abundantly everywhere. I also found this species to be common in deep-water in the Shetland seas, and Mr. Edward has taken it at Banff. It will probably prove to be widely distributed around our coast, and that shrimps dredged in the Coralline Zone, and hitherto referred to as *Crangon vulgaris* belong to this species.

Crangon spinosus (Leach). A few examples dredged in 35 fathoms, 20 miles east of Tynemouth, and also in deep water off Berwick. A specimen from the latter locality was remarkably large, measuring two inches and a quarter from the extremity of the telson, to the end of the antennal scales.

Mysis spiritus (Norman.) The *male* of this species, which was not previously known, was found in some numbers, together with more numerous females. It was taken on all the sandy ground which was dredged. The fourth abdominal foot of the male terminates in two long nearly equal, ciliated, branches, and thus differs widely from the same organ in *M. flexuosa* (Müller), which has the inner branch very short, and the outer very long, and girt through its distal half with a spiral row of exceedingly minute spines. The male of *Mysis flexuosa* (Müller) is synonymous with *Themisto brevispinosa* (Goodsir), and the genus *Themisto*,

(Goodsir), or *Macromysis* (White) must be merged in *Mysis*, the male of which it represents. I believe also that I recognise Goodsir's *Cynthilia Flemingii* in the male of another Mysis, which is abundant on this coast, and which if it be not *Cynthilia Flemingii* is as yet undescribed. The male Mysis, to which I refer, agrees with the description of *Cynthilia Flemingii* in all respects, except that a "minute organ" which *is* attached to the abdominal feet is not "convolute," and is totally different in character from the true "convolute organ" of *Cynthilia (Cynthia) Thompsoni* (Edwards); and the question is, did Goodsir describe the organ erroneously.

Haploops tubicola (Liljeborg). Seven miles off Tynemouth, and in deep water off Berwick. The genus is new to Britain.

Œdicerus parvimanus (Bate and Westw.) was dredged from 40 to 100 miles off Tynemouth. And I also procured it last year when dredging in 25 fathoms, about seven miles off Seaham. Only a single specimen—the type in my collection—was previously known.

Kroyera altamarina (Bate and Westw.). One specimen—the second known—taken 100 miles east off Tynemouth, in 25-30 fathoms.

Dexamine Vedlomensis (Bate and Westw.). This species was described from a single example procured by myself last year in Vedlom Voe, Shetland. The five specimens now taken off this coast make us better acquainted with the species. The antennæ in all the specimens have the same characters, and the notch on the fourth segment of the pleon is deeply cut, and has the anterior edge produced and projecting backwards, so as to overhang the notch (see the figures in the *British Sessile Eyed Crustacea*); another apparently constant specific character is afforded by the backs of the second and third segments of the pleon not only being strongly toothed posteriorly as in *D. spinosa*, but also minutely serrulate. The dorsal armature varies considerably; three of the specimens from this coast agree with the type; a fourth has no spine on the last segment of the pereion; and the fifth has no spines on the last segment of the pereion, and the first of the pleon. The colour is white, with the eye, mouth,

telson, bands on the uropoda, a few spots on the periopoda and minute specks on the body, brilliant crimson. It is remarkable that *D. spinosa* (Mont) the best known member of the genus is not among the eighty-two species of Amphipoda which I have either seen or which have been recorded from the north-eastern coast. *D. tenuicornis* (Rathke) has been sent to me by Mr. G. S. Brady, who has taken it abundantly in rock pools at Sunderland.

Eusirus Helvetiæ (Bate). The species was described from the anterior half of an animal procured at Banff by Mr. Edward; the discovery, therefore, of two perfect specimens in deep water, off the Northumberland coast is of considerable interest.

Calliope bidentata, a new species; 40-50 miles off Tynemouth in 40 fathoms, and 100 miles off Tynemouth in 25-30 fathoms.

Heiscladus longicaudatus (Bate and Westw.), from 7-50 miles off Tynemouth in 25-40 fathoms.

Heiscladus brevicaudatus. An undescribed species, procured in deep water off Tynemouth.

Nœnia caudadentata. A new species, dredged in deep water off the Northumberland coast.

It will be noticed also in the list of species that *Phryxus longibranchialis*—a highly interesting parasitic Isopod—and three species of *Cythere* and *Ichthyophorba hamata* Liljeborg) are also additions to the British Fauna.

EXPLANATION OF THE PLATES.

Plate XII.

Fig. 1-6. *Hippolyte securifrons*, (a little enlarged), and various forms of its rostrum.
7. *H. spinus*; crest of carapace and rostrum.
9. *Mysis Didelphys*, Telson and caudal appendages.
10. Antennal scale; *fig.* 11, its extremity more highly magnified.

Plate XIII.

Fig. 1. *Vaunthompsonia rosea*, magnified.
2. Tail; (*a*), telson; (*b*), peduncle of lateral caudal appendage; (*c*), its inner; (*d*), its outer branch.
3. Last thoracic foot; 3 *a*, whip cilium, more highly magnified.
4. *Cyrianassa ciliata*, first thoracic leg (*a*); palp. (*b*); *fig.* 5, fourth thoracic leg (*a*); palp. (*b*); *fig.* 6, last thoracic leg; *fig.* 7, abdominal foot; (*a*), inner; (*b*), outer member; *fig.* 8, tail; (*b*), telson; (*c*), peduncle of lateral appendage; (*d*), its inner; and (*e*), its outer branch; *fig.* 8 *a*, cilium from apex of outer branch of lateral appendage; *fig.* 9, portion of shell.

Plate XIV.

Fig. 1. *Cyrianassa elegans*, exterior antenna; (*a*), semicircle of cilia on inner half of peduncle; *fig.* 2, mandible; *fig.* 3, fourth thoracic leg; (*a*), foot; (*b*), palp.; *fig.* 4, last thoracic leg; *fig.* 4*a*, whip cilium more highly magnified; *fig.* 5, abdominal foot; (*a*), nipple like process on inner member; *fig.* 6, tail; (*a*), telson; (*b*), peduncle of lateral appendage; (*c*), its outer or lower branch; (*d*), its inner or upper branch.

Report on the Pycnogonoidea, with descriptions of Two New Species. By George Hodge.

The Pycnogons dredged during the expedition belong to four genera—*Pycnogonum*, *Phoxichilidium*, *Pallene*, and *Nymphon*. Of the latter, seven species were taken, one of which is new to science (*N. brevirostre* Hodge,*) and two have not been recorded as British, *N. hirtum* and *N. brevitarse*, although specimens of the new species, and also of those locally new, had previously been taken at Seaham, both by inshore dredging, and from the fishing lines. Only one individual of the genus Pallene was taken, and that a new species (*P. attenuata*, Hodge).

The rarity of the male Nymphons is singular, none were obtained during the expedition, although the number of females was considerable (23); as a general rule this is found to hold, whilst in the case of Pycnogonum, the males are quite common, and the females rarely seen.

Pallene attenuata, *n. sp.*, *Hodge.* (Pl. XV., figs. 1-5).

Rostrum thick, constricted at the base, swelled near the middle and rounded at the apex. Legs long, sparingly hispid; first, second, and third joints short, the second the longest; fourth rather stout, and as long as second and third united; fifth and sixth slender and about the length of fourth; seventh very short; eighth convex on outer margin, straight on inner, with a few short hairs scattered along both margins. A *single* claw at the extremity, which when pressed against the limb reaches to junction of seventh joint. Foot jaws long and slender projecting considerably beyond end of rostrum. Anterior portion of thorax attenuated, and advanced to nearly on a line with the tip of rostrum, where it slightly bulges, and gives origin to foot jaws; immediately behind which is seated the oculiferous tubercle, which is long and narrow. Abdomen long, rounded at apex, slightly tapering to

* The new species described in this paper were characterised in a report presented to the Cambridge meeting of the British Association.

base. At the origin of each leg on the dorsal aspect, is a large wart-like protuberance.

One female of this species was taken near the Dogger Bank, in 25-30 fathoms water, on an oozy bottom.

7. Nymphon brevirostre, *n. sp.*, *Hodge*. (Pl. XV., figs. 6-11).

Rostrum short and stout; foot jaws thick, divergent, second joint or hand, nearly as long as first; palpi five jointed, brush like, first and second joints long and nearly of same length, each of which is equal to the three terminal, the last being the shortest. Thorax robust. Abdomen stout and conical. Oculiferous tubercle midway between first pair of legs. Legs stout, sparingly furnished with stout spine like hairs; first and third joints short, second slender at origin, but swelling upwards; fourth and fifth each as long as the three first; sixth much larger, slender; seventh short; eighth long, slightly bent, and furnished along its inner margin with a few short spines, and terminating in one moderately large claw, and two small ones.

One female of this species was taken near the Dogger Bank under the same circumstances as the foregoing.

Class. CRUSTACEA.

Sub-class. ENTOMOSTRACA.

Order. ARACHNOPODA OR PYCNOGONOIDEA.

Family. **Pycnogonidæ.**

	Males.	Females.	Found living at	Locality.
Pycnogonum littorale, *Strom.*	8	3	25-35	Dogger Bank chiefly.

Family. **Nymphidæ.**

Phoxichilidium coccineum, *Johnston.*	c	c	25-40	Everywhere.
Pallene attenuata *n. sp.*, *Hodge*	...	1	25-30	Dogger.
Nymphon gracile, *Leach.*	...	8	25-45	Everywhere.
grossipes, *O. Fabr.*	...	8	25-45	Do.
femoratum, *Leach.*	...	1	35-45	Berwick Bay.
giganteum, *Johnston.*	...	2	35-45	Do.
hirtum, *O. Fabr.*	...	1	25-35	Dogger.
brevitarse, *Kroyer*	...	1	25-35	Do.
brevirostre, *n. sp.*, *Hodge.*	...	1	25-35	Do.

EXPLANATION OF PLATE XV.

Fig. 1. *Pallene attenuata;* dorsal aspect.
2. ———. Lateral aspect showing large development of abdomen, and oculiferous tubercle; the tubercle near the origin of the leg, and that on the under side of the second joint.
3. ———. Ventral aspect of rostrum, and origin of false feet.
4. ———. Tarsus.
5. ———. Tubercles at the base of the legs.
6. *Nymphon brevirostre;* dorsal aspect.
7. ———. Lateral aspect, showing oculiferous tubercle, abdomen, &c.
8. ———. Under surface of anterior portion of thorax, showing rostrum.
9. ———. Foot jaw.
10. ———. Palpus.
11. ———. Tarsus.

Report on the Annelida.

A LARGE number of species of Annelida were obtained, and carefully preserved, but we are not, at present, able to offer any list of them; the subject being one of great difficulty, and requiring more research than there has been an opportunity of giving to it, since the dredging took place.

Report on the Entozoa.

FEW opportunities were afforded for obtaining Entozoa, those that did occur were not neglected, and a few specimens were found in the interior of the cod and coal-fish which were caught by the crew. No list has, however, been attempted.

Report on the Echinodermata. By Mr. George S. Brady.

OF the Echinodermata twenty-seven species were obtained. Amongst these is an *Ophiura*, now for the first time described, by Mr. George Hodge, although it had previously

been taken on our coast. Besides this there are in the list two interesting additions to our local fauna; viz., *Uraster rosea*, a species hitherto unrecorded on the east coast of England; and *Thyonidium commune*.

The sandy banks lying immediately within the Dogger seem a very favourable locality for the orders *Ophiuroidea*, *Asteroidea*, and *Echinoidea*, which were there met with in greater numbers and variety than elsewhere.

Ophiura texturata, *Lamarck*.

This species was dredged in considerable numbers during the first trip on sandy ground off the Dogger Bank. Many of the specimens were of large size, and some exhibited very plainly the curious mode of reproduction of broken limbs, which characterizes the tribe.

Ophiura albida, *Forbes*.

Several specimens, mostly of rather small dimensions were dredged on a sandy bottom off the Dogger, and in Berwick Bay.

Ophiura normani, *Hodge*.

Several specimens of this hitherto undescribed form were obtained off the Dogger Bank. Mr. Hodge's description of the species will be found at a subsequent page.

Ophiocoma filiformis, *Müller*.

Taken in considerable numbers on a fine sandy or muddy bottom near the Dogger Bank. One or two were also seen during the second trip, but the excessively fragile character of the creature rendered its preservation in perfect condition almost impracticable.

Ophiocoma bellis, *Link*.

Two specimens taken off the Dogger. It is rather surprising that this very beautiful species was not met with in more abundance, especially during the second expedition. It is by no means of unfrequent occurrence off the Durham coast.

Ophiocoma goodsiri, *Forbes.*

This species seems to be tolerably common on rocky ground; clinging chiefly to rugged or perforated stones, from the recesses of which it creeps slowly out on its removal from its native element. Several specimens were taken from five to seven miles east of Tynemouth, and some off Berwick.

Ophiocoma rosula, *Link.*

Very abundant in 20-30 fathoms off the Dogger Bank, and less abundant northwards, on the second trip. This is common on our coast in almost all depths of water, and is occasionally to be met with even between tide marks.

Uraster glacialis, *Linn.*

A few small examples of this—one of the rarest of our local species—were dredged in 15 fathoms, ten miles east of Tynemouth.

Uraster rubens, *Linn.*

Taken in the Laminarian Zone near Holy Island.

Uraster rosea, *Müller.*

One fine specimen was obtained in 25-30 fathoms, off Coquet Island. The diameter of the disk in this example was $\frac{3}{4}$in., and between the extremities of the rays $8\frac{1}{2}$in. The arms are long in proportion to the disk and very tapering; the madreporiform tubercle very lateral. The arrangement of the tubercles in longitudinal rows is also distinctly marked.

Echinaster oculatus, *Penn.*

Two or three small specimens were met with. They were by no means so fine as those which are commonly found between tide marks in our district.

Solaster endeca, *Linn.*

One small individual was taken near the Dogger.

Solaster papposa, *Linn.*

Two or three very diminutive representatives of this fine species were got in shallow water near Holy Island.

ASTERIAS AURANTIACA, *Linn.*

A considerable number of beautiful specimens were taken in 25-30 fathoms, 70-80 miles east of Tynemouth.

LUIDIA SAVIGNII, *Audouin.*

This species occurred pretty plentifully in the same locality as the last. The specimens ranged from three to six inches in diameter. No specimens of the seven rayed form *(L. Sarsii)* were met with. It is to be regretted that the excessive shortness of temper which characterizes *Luidia* has interfered with the preservation of those taken on this trip, so as to render many of them unserviceable as cabinet specimens. In the event of another expedition it would be desirable to try the effect on *Luidia's* constitution of a bucket of hot water from the engine boilers.

ECHINUS SPHÆRA, *Müller.*

In Laminarian Zone off Holy Island. Several young specimens taken in deep water.

ECHINUS MILIARIS, *Leske.*

A few specimens taken with the following, off Coquet Island.

ECHINUS NEGLECTUS, *Lamarck.*

Three or four examples of this species were dredged in 25-30 fathoms off Coquet Island. They are remarkable on account of their having the rows of pores arranged occasionally in sixes—five being the normal number.

ECHINOCYAMUS PUSILLUS, *Müller.*

Abundant in 25-30 fathoms. The dead and denuded shell of this species is of very common occurrence in in-shore dredging off our coast, but except in deep water the animal is not often met with alive. We may remark that its true colour is drab, and not green, as described by Forbes. A very few minutes' exposure to the air, is, however, sufficient to change the hue to an æruginous green, which becomes permanent. This change appears to take place indifferently either in the air or in preservative fluids.

SPATANGUS PURPUREUS, *Müller.*

Very abundant on a fine oozy bottom in 25-35 fathoms, 50-80 miles east of Tynemouth: much less plentiful in similar depths northwards. Many of the specimens were much infested with the little parasite *Montacuta substriata.*

BRISSUS LYRIFER, *Forbes.*

Not so abundant as the preceding or the following species, but taken pretty plentifully in the same locality. Many of the specimens exceeded two inches in length.

AMPHIDOTUS ROSEUS, *Forbes.*

This species occurred in considerable numbers, associated with the two preceding. The specimens were, when first taken, of a pale primrose colour, which changed soon after death to a faint rosy hue.

OCNUS LACTEUS, *Forbes and Goodsir.*

One specimen of this species was among the proceeds of the first trip.

THYONE FUSUS, *Müller.*

Several small examples were dredged in the same locality as the preceding species.

THYONIDIUM COMMUNE, *Forbes and Goodsir.*

One specimen taken from the stomach of a cod on the Dogger Bank.

THYONIDIUM PELLUCIDUM, *Vahl.*

Several specimens were dredged off Berwick, adhering to stones and to the surfaces of dead shells.

PSOLUS PHANTOPUS, *Linn.*

One small specimen was taken in 25-30 fathoms, Berwick Bay.

Report on the Zoophytes. By Mr. Joshua Alder.

Some good Zoophytes were obtained during both cruises, but nothing that had not been previously recorded in my "Catalogue of the Zoophytes of Northumberland and Durham," published in the Transactions of the Tyneside Club. Among the *Hydrozoa*, the most note-worthy is *Sertularia fusca*, a species peculiar to the north-east coast of England and to Scotland. A few specimens of this species were obtained. *Sertularia pinaster* was also met with, and *S. tamarisca* with female capsules. Few *Actinozoa* were met with. The best were *Stomphia Churchiæ* of Gosse, and a *Phellia*, not ascertained, but probably the *P. gausapata*, Gosse, only before found at Wick.

Among the *Polyzoa*, *Menipea ternata*, *Bugula Murrayana*, and *Cellularia Peachii*, northern deep-water species, rare on other parts of the English coast, were procured in considerable abundance. Of *B. fastigiata* another northern form, only two or three specimens were obtained.

The number of species got in the different classes was:—

Polyzoa	29
Hydrozoa	43
Actinozoa	12
Total	84

In the following table the three columns represent the same localities as in the Report on the Mollusca, the presence of each species being marked by an asterisk.

POLYZOA.

Salicornaria farciminoides, *Johnst.*	*	...	*
Cellularia Peachii, *Busk.*	*	*	*
Menipea ternata, *Ellis and Soland.*	...	*	...
Scrupocellaria scruposa, *Linn.*	*	...	...
Gemellaria loricata, *Linn*,	*	...	...
Bugula Murrayana, *Bean.*	...	*	*
fastigiata, *Fabr.*	...	*	*

Flustra foliacea, *Linn.*	*	...	...
truncata, *Linn.*	*	...	*
Carbasea papyrea, *Pall.*	...	...	*
Membranipora pilosa, *Pall.*	...	...	*
Flemingii, *Busk.*	...	...	*
Pouilletii, *Audouin.*	...	...	*
Lepralia concinna, *Busk.*	...	...	*
trispinosa, *Johnst.*	...	...	*
coccinea, *Abildg.*	...	...	*
linearis, *Hassall.*	...	...	*
Peachii, *Johnst.*	...	...	*
ventricosa, *Hassall.*	...	...	*
Cellepora pumicosa, *Linn.*	*	*	*
ramulosa, *Linn,*	*	...	*
Skenei, *Ellis and Soland.*	...	...	*
Tubulipora serpens, *Linn.*	*	*	*
patina, *Linn.*	...	...	*
hispida, *Flem.*	...	...	*
Alecto major, *Johnst.*	...	...	*
Crisia eburnea, *Linn.*	*	*	...
Alcyonidium gelatinosum, *Pallas.*	...	...	*
Pedicellina echinata, *Sars.*	...	...	*

HYDROZOA.

Eudendrium rameum, *Pall.*	*	...	*
capillare, *Alder.*	...	...	*
Atractylis ——— ?	*	...	...
Tubularia indivisa. *Linn.*	*	...	*
gracilis, *Harvey.*	*	...	*
simplex, *Alder.*	*	...	*
gigantea, *Lam.*	*	...	...
Halecium halecinum, *Ellis.*	*	*	...
Beanii, *Johnst.*	...	...	*
muricatum, *Ellis and Soland.*	*	...	...
tenellum, *Hincks.*	...	...	*
Sertularia polyzonias, *Linn.*	*	...	...
tricuspidata, *Alder.*	...	...	*
tenella, *Alder.*	*	*	...
rugosa, *Ellis.*	...	*	*
rosacea, *Linn.*	*	...	...
pinaster, *Ellis and Soland.*	...	*	...
tamarisca, *Linn.*	...	...	*
abietina, *Linn.*	*	*	*

Sertularia filicula, *Ellis and Soland.*	...	*	*
argentea, *Ellis and Soland.*	...	...	*
fusca, *Johnst.*	...	...	*
Thuiaria thuia, *Linn.*	*	*	*
Antennularia antennina, *Linn.*	...	...	*
ramosa, *Lamx.*	...	...	*
Plumularia falcata, *Linn.*	*	*	*
pinnata, *Linn.*	*	*	*
Catherina, *Johnst.*	...	*	*
frutescens, *Ellis and Soland.*	*	...	...
Laomedea longissima, *Pall.*	*	...	*
geniculata, *Linn.*	*	...	*
lacerata, *Johnston.*	...	...	*
Campanularia volubilis, *Linn.*	*	*	*
Johnstoni, *Alder.*	*	*	*
raridentata, *Alder.*	*	*	*
Calicella dumosa, *Flem.*	*	*	*
humilis, *Hincks.*	*	*	*
syringa, *Linn.*	...	*	...
Reticularia serpens, *Hassall.*	*	*	*
Grammaria robusta, *Stimpson.*	...	...	*
Coppinia arcta, *Dalyell.*	...	*	...
Cyanea capillata, *Linn.*	...	...	*
Cyanea ? ————?*	...	...	*

ACTINOZOA.

Adamsia palliata, *Forbes.*	...	...	...
Phellia gausapata (?) *Gosse.*	...	...	*
Bolocera Tuediæ, *Johnst.*	...	*	...
Tealia digitata, *Müll.*	...	*	*
Stomphia Churchiæ, *Gosse.*	...	*	*
Zoanthus Couchii, *Johnst.*	...	*	...
Pennatula phosphorea, *Linn.*	*	*	*
Virgularia mirabilis, *Linn.*	...	*	*
Alcyonium digitatum, *Linn.*	*	*	*
glomeratum (?)	...	*	*
Beroe ———— ?	...	*	*
Cydippe ———— ?	...	...	...

* A very beautiful and striking medusa, perhaps referrable to this genus, and probably undescribed, awaits further examination.

Report on the Foraminifera, by Mr. Henry B. Brady, F.L.S.

It can scarcely be expected that the details now presented, relative to organisms so minute as the Foraminifera, and constituting so small a proportion of the material that must necessarily be searched for them, should be of a complete and exhaustive character; at the same time a few remarks in connection with the more interesting forms which have been identified may not be out of place.

Previous to these operations no opportunity of obtaining material from deep water off our coast had occurred, consequently it was natural to suppose that many forms would be brought to light, which had not hitherto been noted. The varieties occurring in the shell-sand of the sea beach are chiefly those frequenting shallow water; the dead shells of which are washed up by the tide in great numbers, mixed with broken mollusk shells, fragments of coal, and the like, and are chiefly referrible to a dozen or fifteen forms.

The word *species* must be understood as a relative rather than as an absolute term, in speaking of the Foraminifera, there is still so much uncertainty as to the extent of the variation compatible with specific identity. The beautiful plates in Professor Williamson's monograph afford so ready a means of reference that the end in view is the most readily attained by adhering to his nomenclature. This author describes and figures about one hundred species and varieties as British—the more recent and more extended researches of Messrs. Parker and Jones considerably reduce the number; but for obvious reasons it would be inconvenient to make use of their nomenclature and Professor Williamson's drawings.

Unfortunately the material from the first trip to the Dogger Bank was not preserved—being supposed to be valueless—but from the washings of mollusk shells and zoophytes, some mud was afterwards obtained, scarcely amounting to a tablespoonful after the coarser portion was sifted out, and in

this, specimens of twenty-four forms were found. It is almost impossible to ascertain the value of apparently waste matter on ship-board, and in future nothing will be cast aside until thoroughly examined.

On the second excursion a portion of the produce of the dredging off Coquet Island was lost by accident; but sufficient remained to yield to the microscope twenty-nine forms.

Cautioned by previous losses, greater care was afterwards taken, and the various hauls in Berwick Bay gave, as a result, no less than fifty varieties or one half of Professor Williamson's list.

The total number of forms taken was fifty-five, of which thirty-two had not been previously observed on our coast, a result in every respect gratifying. Further details with respect to these will appear in my catalogue of the local species, now in progress.

One or two facts, however, may perhaps, be worthy of note here, viz. :—

The great abundance and beauty of the one-celled flask-like forms *(Lagena* and *Entosolenia)*, of which almost all the varieties known to Britain were found.

The extraordinary prevalence of the genus *Dentalina*, especially in Berwick Bay, occurring in every gradation, from the extreme form of *D. subarcuata*, to the extreme of *D. legumen*; no line of demarcation being perceptible between the slender, tapering shell, with ventricose segments, and the more robust, generally curved form known as *D. legumen.*

On the same ground *Polymorphina* frequently contracts the luxuriant irregular growth, figured in Williamson as *Polymorphina lactea* var. *fistulosa.*

It should be remembered in judging of the amount accomplished, that the area compassed by those dredgings, the results of which were available for examination for this special class of organisms was a very limited one; that, indeed, almost the whole accrued from a single day's operations in one locality.

Sub-Kingdom **Protozoa**.

FORAMINIFERA.

	Dogger Bank, 25-30, oozy.	Coquet Island, 25-35 sand and gravel.	Berwick Bay, 30-50, coarse sand & gravel.
Orbulina universa, *D'Orb.*	...	*	*
Lagena vulgaris, *Williamson.*	*	*	*
var. clavata.	*	*	*
var. perlucida.	*	*	*
var. semistriata.	...	...	*
var. striata.	...	*	*
var. interrupta.	...	...	*
var. gracilis.	*	...	*
var. substriata.	*	*	*
Entosolenia globosa, *Walker.*	*	*	*
costata, *Will.*	*	...	...
marginata, *Walk.*	*	*	*
var. lagenoides.	...	...	*
squamosa *Mont.*	...	*	*
var. scalariformis.	*	*	*
var. catenulata.	...	...	*
var. hexagona.	*	...	*
Nodosaria radicula, *Linn.*	*	*	*
pyrula, *D'Orb.*	...	...	*
Dentalina subarcuata, *Mont.*	*	*	*
legumen, *Linn.*	...	...	*
var. linearis.	...	...	*
Cristellaria calcar, *Linn.*	...	...	*
Nonionina crassula, *Walk.*	...	...	*
Jeffreysii, *Will.*	...	...	*
Polystomella crispa, *Linn.*	*	*	*
umbilicatula, *Walk.*	...	...	*
Patellina corrugata, *Will.*	...	...	*
Rotalina Beccarii, *Linn.*	*	...	*
turgida, *Will.*	...	...	*
concamerata, *Mont.*	...	*	*
Globigerina bulloides, *D'Orb.*	*	...	...
Planorbulina vulgaris, *D'Orb.*	*	*	*
Truncatulina lobatula, *Walk.*	*	*	*
Bulimina pupoides, *D'Orb.*	...	...	*
var. marginata.	*	*	*
var. fusiformis.	...	...	*

	Dogger Bank, 25-30, oozy.	Coquet Island, 25-35, sand and gravel.	Berwick Bay, 30 - 50, coarse sand & gravel.
Bulimina pupoides var. compressa.	...	...	*
elegantissima, *D'Orb.*	...	...	*
Cassidulina lævigata, *D'Orb.*	...	...	*
Polymorphina lactea, *Walk.*	*	*	*
var. fistulosa.	*	*	*
var. communis.	...	*	*
Textularia cuneiformis, *D'Orb.*	*	*	*
var. conica.	...	...	*
variabilis, *Will.*	...	*	...
var. spathulata.	*	...	...
Biloculina ringens, *D'Orb.*	*	*	*
var. carinata.	...	*	...
var. patagonica.	...	...	*
Spiroculina depressa, *D'Orb.*	...	*	*
Miliolina trigonula, *Lamk.*	...	*	*
seminulum, *Linn.*	*	*	*
bicornis, *Walk.*	...	...	*
var. angulata.	...	*	...

Report on the Sponges.

Very few sponges were obtained, and no list of them has been drawn up.

Report on the Diatomaceæ.

Though not strictly within the compass of a dredging list the following record of the Diatomaceæ, which were collected, may add to the interest and the completeness of the report. Mr. D. O. Brown preserved portions of any material likely to yield specimens of this tribe of organisms, and subsequently made mountings of them for microscopic examination.

The determination of the species was kindly undertaken by Mr. Fred. Kitton, of Norwich, who has furnished the subjoined list.

Pinnularia distans, *Smith's Synopsis.*
Orthosira marina, *Smith's Synopsis.*
Pleurosigma marinum, *Donkin.*

Coscinodiscus radiatus, *Ehrenberg.*
excentricus, *Ehrenberg.*
Actinoptychus undulatus, *Ehrenberg.*
Biddulphia aurita, *Brébisson.*
Actinocyclus Ralfsii, *Ehrenberg*, (*Smith*).
Eupodiscus tessellatus, *Roper.*
Syndendrium diadema, *Ehrenberg.*
* Gomphonema gemmatum, *Agardh.*
Actiniscus Sirius, *Ehrenberg.*

Tabular Summary of the foregoing Reports.

	1. 10-30 miles east of Tynemouth. Hard bottom, 15-25 fms.	2. Western slopes of Dogger Bank, 80-100 miles east of Tynemouth, 20-30 fms.	3. North Northumberland. Chiefly Berwick Bay, ground hard and various, 25-55 fms.	Total.
Mollusca	56	56	105	138
Crustacea, including Pycnogonidæ	55	47	50	101
Echinodermata	7	16	16	27
Zoophyta	34	26	47	84
Foraminifera.....	..	24	50	55
Total.....	152	169	268	405

Specimens of nearly all the species which were obtained have been deposited in the Newcastle Museum, where they can always be referred to.

* This is a fresh-water form, and probably an interloper, washed down by the Tweed.

XXXVII.—*On a new Sand Star of the genus Ophiura (Ophiura Normani), found on the coast of Northumberland and Durham.*

By George Hodge. (Pl. XVI.)

During the summer of 1861 whilst dredging at Seaham upon a sandy bottom, in water varying from 6 to 25 fathoms, a number of small Sand Stars were brought up, associated with *Ophiura texturata* and *Ophiura albida*. Their actions were so singular as to claim a more than ordinary examination; when it was noticed that although resembling, in some respects, young forms of *O. texturata* and *O. albida*, they presented features that at once distinguished them from those species—the most striking of which were the longer and more attenuated character of the rays, as compared with the size of the disc—their excessively lively movements, and the wonderful pliability of the rays. These several circumstances caused them to be regarded as distinct from the two well known species above named: a careful examination under more favourable circumstances confirmed this opinion.

The surface of the disc is beautifully rosulated; a large plate being in the centre, around which, at a little distance, are arranged five other plates; beyond these, other five plates, and so on, the interspaces being filled in with circlets of little scales producing an appearance not unlike that seen in *Ophiocoma bellis*.

At the base of the rays, close to the disc (upon the upper surface), is a crescent of short spines, the concave side of the crescent being outwards.

These are features entirely different from what we find in in either *Ophiura texturata* or *O. albida*; in both instances the upper surfaces of the discs present no trace of the beautiful and *distinct* rosulated character here seen; neither do we find the crescentic arrangement of spines upon the basal portion of the rays.

The characters of the species under consideration may be thus defined:—

Disc either pentangular or round, the former pertaining to well grown individuals, the latter to young. Upper surface of disc rosulated; under surface corresponding with the other members of the genus. Two clasping scales at the origin of each ray, each bearing above ten short spines. A crescent of eight or ten short blunt spines on upper surface of rays close to the disc. Lateral ray plates bearing five moderately long spines. Upper ray scales nearly square, slightly tapering towards the disc. Rays about four times as long as the diameter of disc, which in well grown individuals measures about a quarter of an inch. Colour reddish yellow, occasionally of a pale sandy tint.

These features being so constant and distinct, there can be no doubt of the species under consideration being new to our fauna, and as such it affords me much pleasure to name it after my friend the Rev. A. M. Norman, who is, in fact, the original discoverer, having taken a single specimen some years ago in the Frith of Clyde, and at Shetland during 1861 he also took three or four specimens, in both instances, however, they only received a glance, and were assumed to be the young of *O. texturata*, for which they may easily be mistaken unless subjected to microscopical examination.

This species would appear to be generally distributed, having been found at three widely different parts of our coasts. It is common here, between sixty and seventy specimens having been dredged here in a few hours, owing, however, to their excessive fragility, few were obtained perfect.

EXPLANATION OF THE FIGURES (Pl. XVI).

1. *Ophiura Normani*, slightly enlarged.
2. Upper surface (magnified) showing the rosulated character of the disc, and the crescent of spines upon base of ray.
3. Under surface of disc (magnified), with portion of ray showing form and arrangement of spines.

XXXVIII.—*Contributions to the Marine Zoology of Seaham Harbour.* By GEORGE HODGE. (Pl. XVI. fig. 4—11.)

On some undescribed Marine Acari.

Little attention has been paid to the British species of marine acari, judging from the few species at present known. No doubt their rarity and minuteness have been the principal reasons for this apparent neglect; for, with the exception of Professor Allman and Mr. Gosse, no naturalists have recorded their capture in our seas. The former discovered a single species in the nostrils of a seal, as mentioned by Mr. Gosse, who describes three species,* viz., *Halacarus rhodostigma*, *H. ctenopus*, and *Pachygnathus notops*, found by him amongst sea-weed, the two former at Weymouth and the latter at Ilfracombe. I figured a species of the latter genus† *(P. Seahami)*, which is found here amongst sea-weed ; and, to the best of my knowledge, these are the only recorded British species.

A careful search, during the last two years, amongst the refuse washed from zoophytes, &c., from deep water (15-25 fathoms), and from between tide marks, has rewarded me with four forms, which I take to be new. Two of them evidently belong to the genus Halacarus, one to Pachygnathus, and the other to Leptognathus.

Before proceeding to describe these animals, it may not be amiss to allude to the extraordinary difference in the number and position of the visual organs. In one species these organs are altogether absent *(Halarachne halichœri)* ; in another we find a single dark eye just behind the base of the rostrum *(Pachygnathus notops)*; in another a dark irregular patch at each side of the thorax, at the base of the second legs, *(Halacarus oculatus)*; in another, two compound eyes similarly placed to the last, with the addition of a much smaller compound eye, just behind the rostrum *(Leptognathus falcatus)*.

* Annals and Magazine of Natural History, 1855, vol. 16.

† Transactions of Tyneside Naturalists' Field Club, vol. 4, page 319.

Mr. Gosse, in the paper before alluded to, mentions the difference he observed between two specimens of *Halacarus ctenopus*. One appeared destitute of eyes, for he says, "No eyes were visible, unless a black speck on each side of the bulb of the rostrum was an eye, which I much doubt, from the position of the conspicuous organs of vision in the former species," (H. rhodostigma). The next he examined had three eyes. "Strongly conspicuous, also, were two lateral black eyes, which exactly agreed with those of H. rhodostigma, and a third orbicular eye, also black, close behind the rostrum. Neither of these eyes was visible in the specimen I before examined." And as the number and position of the eyes vary, so do their form and size. In Pachygnathus, the visual organ consists of a single, highly refractive dark coloured sphere. In Halacarus, they take an irregular form, slightly angular, and apparently composed of a number of minute, dark-coloured granules, aggregated together, and so minute that they cannot be separately resolved. In Leptognathus, the lateral eyes are a mulberry-like mass, consisting of about eight moderately large spheres closely associated; the central anterior organ, consisting of four such spheres, smaller than the lateral ones, and of irregular size, differing in this respect from the others, which are moderately uniform in dimensions. These spherules are very minute, the largest being $\frac{1}{2000}$ of an inch in diameter, and the smallest half that size, or $\frac{1}{4000}$.

Class. ARACHNIDA.

Order. ACARINA.

Family. ORIBATADÆ.

Genus. HALACARUS, *Gosse*.

1. A. granulatus. Pl. XVI., figs. 4, 5.

Length of body to tip of rostrum, $\frac{1}{40}$ of an inch; colour, orange brown; legs, scarcely coloured; the shield truncate a little below the insertion of the palpi.

Rostrum tapering to a short point, and furnished with two long mandibular organs, with a jointed process at their free ends. Palpus composed of four joints, the second

being the largest; first and third nearly alike; fourth (the terminal), narrow and tapering to a blunt point, set with two strong hairs which spring from near the base.

Legs little differing in length, moderately hispid, the two anterior pair shorter than the posterior; third joints shorter and larger than the others; terminal narrow, tapering, and tipped with two falcate ungues, which are delicately pectinated on the inner margin, and furnished with a sharp tooth on the outer edge, about one-third distant from the point of the claw. Between these ungues is a very small hook, of similar form to the larger.

Eyes, two; lateral; situate a little behind the origin of the second pair of legs; irregular in form, slightly angular, and composed of dark-coloured granules of minute size.

Upper surface of body studded with minute irregular granules, which sometimes form a rosette, differing however in character from those seen in *H. rhodostigma*.

A single individual obtained from the washings of zoophytes, from 15-25 fathoms.

2. H. OCULATUS. Pl. XVI., figs. 8, 9.

Length of body to tip of rostrum, $\frac{1}{75}$ of an inch; colour, reddish-brown. Rostrum narrow at base, slightly bulging out, and then tapering to a blunt tip, slightly cleft, and forming two lips from which issue two slender styles. Palpus composed of four joints, the second being the largest; first larger than the third; fourth (the terminal) narrow, slightly tapering to a point and furnished with two strong hairs, springing from near the base.

Legs, little differing in length, sparingly hispid; the anterior pair a trifle shorter than the others; first, second, and fourth joints small; third and fifth large and short; sixth (terminal), straight to within about a third of the tip, where it abruptly forms a shoulder (on one side), and then curves to the tip, from which spring two falcate ungues, each provided with a short tooth upon its outer margin;

within them, near the base, is a small hook of similar form to the others; two short filiform appendages issue from near the tip of the last joint, slightly curved, and terminating in blunt points; on the "shoulders" are two long hairs, and a third a little below them.

Eyes, two; lateral; situate a little behind the origin of the second pair of legs, irregular in form, and composed of a number of small granules.

A distinct line runs across the body between the eyes, from which other lines branch, forming a long oval, superiorly truncated, representing the abdominal region; two irregular lateral spaces containing the eyes; and a thoracic region, extending from the base of the rostrum to the abdominal region. All of these divisions are regularly figured with dark hexagonal markings, with clear spaces between, producing a honey-combed appearance.

The chief peculiarity of this species is the form of the last joint of the tarsus, which affords a strongly marked character, differing in a singular manner from the same parts in other species of marine acari.

A single individual from zoophytes, from 15-25 fathoms.

Genus. PACHYGNATHUS.

3. P. minutus. Pl. XVI., figs. 10, 11.

Length of animal, from anus to end of rostrum, $\frac{1}{90}$ of an inch; colour, reddish-brown; shield, truncate at insertions of first legs; rostrum, a stout bulb, tapering abruptly, and terminated by two lip-like organs; legs, short and stout, first joints small, second of similar dimensions but much rounded, third large and swelling in an upward direction, fourth similar to second, fifth short and very stout, sixth tapering abruptly and furnished with two falcate ungues, with a small tooth on the outer edge of each. At the base of the ungues, between them, is a small hook. Legs smooth, with the exception of fifth and sixth joints, which have a few

short stout hairs. Legs and rostrum irregularly dotted with minute granules; other markings varied in character. The posterior portion of body minutely corrugated, and delicately sulcated with a broad curved band, approaching the origin of second legs; above the sulcus are irregular cell-like markings, by degrees becoming less visible as they approach the rostrum.

Eye, a single dark speck behind the rostrum.

This curious species occurred on some stems of *Coryne eximia* from between tide marks; and from the specimen obtained possessing only three pairs of legs, it would appear to be a young individual.

Genus. LEPTOGNATHUS.

4. L. falcatus. Pl. XVI. fig. 6, 7.

Length of animal to tip of rostrum, $\frac{1}{40}$ of an inch; colour, orange brown. Shield truncate *above* insertion of first legs. Rostrum, a stout bulb tapering to a narrow rounded tip, which under pressure is seen to be bifid; external to this are two palpi-like organs, consisting of a jointed process closely attached to the rostrum, terminal joint slightly curved, divergent from rostrum, and furnished with three stout hairs. From the narrow part of the rostrum proceed two hairs, which stand out at right angles.

Legs rather short for size of the animal, the several joints scarcely differing in length, with the exception of the sixth, which is long, thin, and terminated by two ungues of simple character; at the tip of last joint, near the origin of the ungues are four stout bristles.

Eyes three, compound,* one being immediately behind the base of the rostrum, the other two behind the second pair of legs; the anterior eye composed of four minute granules, the largest about $\frac{1}{4000}$ of an inch in diameter; the lateral,

* Mr. Gosse, in his Marine Zoology, in defining the characters of the Marine Acari, says they have not "compound eyes;" this would however need some modification, or that the word compound should be used in a more restricted sense than is generally done—possibly he means that the eyes of these animals are not compound after the manner of the compound eye of a crab or shrimp, still it is an undoubted fact that some of the Marine Mites have visual organs composed of a number of lenses irregularly grouped, so as to form a composite eye.

of eight such granules, the largest about $\frac{1}{2000}$ of an inch diameter.

Upper surface of shield divided by delicately sulcated lines into four regions, the interspaces being free from markings; the anterior and two lateral spaces may be said to represent the thorax, and contain the eyes, whilst the posterior may naturally represent the abdominal portion of the animal.

An irregular dark line extends from the anterior eye to opposite the insertion of the last pair of legs.

From the peculiar character of the rostrum of this species—the absence of true palpi, and the number of eyes, it would appear to form the type of a new genus which has accordingly been established for its reception.

It is difficult to say whether the divergent organs, springing from the rostrum, should be considered palpi or mandibles; judging from analogy, they present the appearance of the former as witness their jointed character, but on the other hand, being coalescent with the rostrum they may perhaps, with greater correctness, be considered as a part of that organ.

Two specimens have occurred, both obtained from the washings of Zoophytes from 20-30 fathoms.

DESCRIPTION OF PLATE XVI. (In Part).

Fig. 4, 5. *Halacarus granulatus*, x 55, with cleave &c., x 200.
Fig. 6, 7. *Leptognathus falcatus*, x 55, do. x 200.
Fig. 8, 9. *Halacarus oculatus*, x 55, do. x 200.
Fig 10, 11. *Pachygnathus minutus* x 55, do. x 400.

XXXIX.—*Notes on the Flora of the Old and West Hartlepool Ballast Hills, with a list of the rarer and more characteristic species.* By M. A. Lawson, B.A., Trin. Coll., Cam.

The list which accompanies this paper contains only the more rare or characteristic plants which I have found on the two Hartlepool Ballast Hills.

It extends over a period of about seven years, when I first began to pay attention to the subject. For long I was foolish enough to throw away any plant I could not at the time make satisfactorily out. Otherwise I believe my list would have contained a larger number of foreign species than it does at present.

For a long time I have observed that after the ballast is first thrown out, it is covered almost solely with Annuals, but in two or three years these Annuals have either entirely disappeared, or else, from their scarceness, have become a very inconspicuous part of the flora, and a vast variety of Perennials have sprang up in their place, which in their turn overrun the whole ground, and then gradually dwindle away to a most minute fraction of their former abundance, so that even if there were no spot from which they had entirely disappeared, it might be reasonably supposed that they would in a few years, at the furthest, become extinct.

Now, at the extreme South end of the Old Hartlepool Ballast, there are several such spots utterly destitute of Perennials, without even, I believe, a patriarchal "Diplotaxis tenuifolia," or "Reseda lutea."

On these spots there are no bents and very little sand; but there is—and this seems eventually to get the better of everything, —a thick covering of short coarse grass, with a sprinkling of "ragwort," "yarrow," and "Carduus nutans." But it is not only on these few isolated spots that this is observable, for the same is evident on a regularly graduated scale from the comparatively new ballast to these bare spots,—the grass gets thicker, and the perennial shrubs more scraggy.

This, I think I may safely say, is observable on the whole of the Old Hartlepool Ballast Hills, but a part of West Hartlepool

presents a completely different aspect, especially that part lying west of the "Centaurea Calcitrapa." Here the ground, instead of being covered with shrubs or grass, is almost quite bare, the plants have not been disturbed by bents or sand, for they are inland. They seem rather to have been quietly extinguished, but from what cause, I am quite at a loss even to guess.

I have never been upon any Ballast Hills except those at Hartlepool, consequently my personal knowledge is confined to very narrow limits. Still, what is true in one case, one would naturally conclude, would hold good in others under similar circumstances.

Mr. Edward Mounsey has told me that very few of the plants mentioned by Winch, are now to be found upon the Sunderland Ballast Hills, which seems to bear out the supposition that none, or very few, of these introduced plants are finally naturalized.

I was first led to make a list of these plants from the idea that they would spread themselves into the neighbouring country, and become confounded with the truly indigenous flora, but I am quite satisfied that such is not the case, and that we need apprehend no danger on that score.

Of course I do not pretend to say that *all* the plants do come up exactly in the years allotted to them by their affixed numbers. But what I do mean is this, that these periods are so distinctly marked as to admit of this arrangement, and the practical use of such an arrangement is to show the fruitlessness of searching for Annuals on old ballast, or for Perennials on that lately thrown out. For instance, the vanity of searching for "Papaver somniferum" or "Borago officinalis" on seven years old ballast, or for "Clematis Vitalba," or "Epilobium angustifolium" on two years old.

I know of no better exemplification of the "struggle for existence" than is exhibited on these Ballast Hills. It is interesting above measure to notice how (*e.g.*) "Mercurialis annua" is swallowed up by "Diplotaxis," how "Reseda lutea," or "Glaucium luteum" gives in, after a long fight, to the combined attack of jugwort and grass, and how at last even the sturdy "Diplotaxis" is punished, for its cruelty to others, by the thick coarse grass.

The great difficulty in naming Ballast Hill plants arises from two causes, the first of which is the great deformities and monstrosities that are met with, naturally attendant upon great change of temperature or unusual dryness. The second cause arises from the impossibility of forming any idea from what part of the world the plants have come, and consequently the difficulty in referring them to their proper books. There might be growing side by side "Centaurea Orientalis," from Odessa, and "Sinapis Monensis," from the west coast of our own country, and no clue whatever to distinguish their native localities.

The periods to which the figures 1, 2, 3, relate, are those after the ballast is thrown out, in which the species seems to have come to, or have passed its most luxuriant stage. As a general rule the Ballast Hills during the first three years are, for the most part, covered with Annuals. This I call the 1st or period of Annuals. The 2nd, that of Perennials, extends from the end of the third year to the end of the tenth. After which comes the 3rd or Constant period, when coarse grass, ragwort, and yarrow, hold the ground undisturbed by any succeeding set of plants. When more than one number is affixed, the plant is observed to flourish during the end of one period, and the beginning of the next.

2 3	Clematis vitalba	One large patch on the railway embankment by the second arch north of Hartlepool.
1	Delphinium consolida	One fine plant, Old Hartlepool 1858.
1	Papaver hybridum	Old Hartlepool.
1	argemone	Old and West Hartlepool.
1	somniferum	Old and West Hartlepool, occasional plants, one this year.
2	Glaucium luteum	Old Hartlepool, common.
2	Nasturtium amphibium	Old Hartlepool, occasional plants.
2	palustre	Old Hartlepool, common.
2	sylvestre	Old and West Hartlepool, common.
1	Sisymbrium Irio	Old Hartlepool, rare.
	sophia	Old and West Hartlepool, common.
1	Erysimum cheiranthoides	Old Hartlepool, very rare.
1 2	Brassica oleracea	Old Hartlepool, once very common.
1	Sinapis monensis	Old Hartlepool, rare.

2	Diplotaxis tenuifolia	The most abundant of all ballast-hill plants.
1	Camelina sativa	Old and West Hartlepool, common in parts this year, but I never saw it before.
1	Lepidium campestre	Old Hartlepool, occasional plants.
1	sativum	West Hartlepool, rare.
1	ruderale	Old and West Hartlepool, common
1	Senebiera didyma	Old Hartlepool, rare.
1 2	Cakile maritima	Old Hartlepool, common.
1	Raphanus raphanistrum	Old Hartlepool, occasional plants.
1	maritimus	Old and West Hartlepool, occasional plants.
2	Reseda lutea	This is another of the commonest ballast-hill plants.
2	fruticulosa	About half a dozen fine plants, West Hartlepool, where it seems quite settled.
1	odorata	Two or three plants on about three year old ballast, West Hartlepool.
2	luteola	A very common plant.
1 2	Silene maritima	Old Hartlepool, but soon dies out.
1	otites	Old Hartlepool, very rare.
1	Erodium moschatum	West Hartlepool, one plant.
1	Linum angustifolium	I found quantities of this and L. perenne four years ago.
1	usitatissimum	Old Hartlepool, common.
2 3	Ulex Europæus	Old Hartlepool, several bushes on the older ballast.
2 3	Sarothamnus scoparius	Old Hartlepool, on the older ballast.
2	Medicago sativa	Old Hartlepool, common.
2	falcata	West Hartlepool, one very large plant this year, on old ballast.
2	Melilotus vulgaris	Old and West Hartlepool.
2	Lathyrus sylvestris	Old Hartlepool Railway embankment beyond the second arch north of Hartlepool, in very great profusion.
2	Onobrichis sativa	Old Hartlepool, especially at the railway side opposite the rope works.
2	Epilobium angustifolium	Old Hartlepool, two or three plants for several years.

1	Œnothera biennis	Old and West Hartlepool, occasional plants.
1 2	Fœniculum officinale	Old and West Hartlepool, rather common.
2 3	Pastinaca sativa	One of the commonest of ballast-hill plants.
2	Dipsacus sylvestris	Old Hartlepool, common.
1	Senecio viscosus	Very common on the fresh ballast, but I never found it on ballast older than three years.
2	Aster tripolium	Old Hartlepool, once common, and growing to an enormous height.
1	Erigeron canadensis	Old and West Hartlepool, rather common.
1	acris	Old Hartlepool, rare.
1	Chrysanthemum segetum	Old Hartlepool, occasional plants.
2	Anthemis tinctoria	I found a large plant on the Old Hartlepool ballast-hills five years ago. It increased to a magnificent little shrub, when it was smothered up with fresh ballast. I found also two plants this year, on the West Hartlepool ballast.
2	Artemisia vulgaris	Another of the commonest plants.
2	Tanacetum vulgare	Old Hartlepool, common.
1	Centaurea cyanus	Old Hartlepool, common.
2	calcitrapa	West Hartlepool, on old ballast very fine bushes spreading and nearly three feet high.
2	orientalis	West Hartlepool. Of this exquisite Caucasian plant I found one large erect bush, about four feet high. I counted over a hundred buds upon it. The horns of the involucral scales are, in the early bud very well developed, but in the flower they altogether disappear.
2	Carduus tenuiflorus	A very common plant on older ballast generally accompanied by quantities of Artemisia vulgaris.
2	Cichorium intybus	Old Hartlepool, common, West Hartlepool, less common.

1	Borago officinalis	Old Hartlepool, occasional plants.
1	Anchusa officinalis	Old Hartlepool, rare.
2	Symphytum officinale	Old Hartlepool, rare, also variety *S. patens.*
2	Echium vulgare	Old Hartlepool, very common, of every variety of shade, from deep blue to white.
1	Solanum nigrum	Old Hartlepool, common.
2	dulcamara	Old Hartlepool.
1 2	Hyoscyamus niger	Old Hartlepool, common.
1	Verbascum thapsus	Old Hartlepool, one plant many years ago.
2	blattaria	Old Hartlepool, one large plant lived two or three years.
1	Linaria spuria	Old Hartlepool, rare.
1	minor	Old Hartlepool, rare.
1 2 3	vulgaris	Old Hartlepool, very common.
1	Salvia verbenaca	Old Hartlepool.
1 2	Verbena officinalis	Old Hartlepool, frequent.
1	Salsola kali	Old Hartlepool, rather common.
1	Schoberia maritima	Old Hartlepool, common. Nearly all the common Chenopodia are to be found.
1 2	Beta maritima	Old and West Hartlepool, common.
1	Atriplex littoralis	Old and West Hartlepool, common.
2 3	Euphorbia amygdaloides	Railway embankment beyond the second arch north of Hartlepool. abundant.
1	Mercurialis annua	A very common plant, especially on fresh ballast.
1	Phalaris canariensis	Old Hartlepool, occasional plants

There are two very gaudy Corymbiferous plants and one Cichoraceous, I cannot make out. In the year 1856 a large crop of very fine "Mochella esculenta" came up in various parts, principally on the fresh ballast.

SEATON CAREW, DECEMBER, 1862.

XL.—*On the Geological Features of the Parish of Edmondbyers.*

By the Rev. W. Featherstonhaugh, M.A.

The Parish of Edmondbyers, for five miles, forms the north west boundary of the County of Durham, and is mostly unenclosed moorland. The higher ranges of hills, varying from 1,000 to 1,300 feet above the level of the sea, are composed of beds of sandstone, of various qualities, and form, I believe, a part of the "Millstone grit" of geologists, the strata of which dip towards the south east, and overlie, in downward order respectively, beds of iron-stone, lime-stone, (both the thin stratum called "fell-top-limestone," and the massive Stanhope beds,) and again the metalliferous strata which furnish the mineral wealth of the Derwent Heads and Allenheads lead mines.

The sandstone beds are found to consist of three separate and quite distinct varieties. The lowest is a coarse, quartzose, durable sandstone, imperishable as a building stone; of which detached masses lie scattered over the surface of the moor, either in separate blocks, or in congregated heaps, the former burden of some grounded glacier, or covering the shelving beach of an ancient sea, which, by the continued beating of its angry surf, has detached them from the disjointed and ragged face of the cliff exposed above. The next variety of sandstone, upwards, is a compact, fine-grained, massive freestone, valuable for all finer building purposes, from the purity of its colour, its freedom from chemical elements injurious to permanency, its excellent working qualities under the chisel, and the size and uniformity of the blocks which it furnishes. The upper portion of these beds consists of laminated micaceous sandstone, producing the thin grey roofing slate adopted in the district, flagstones of durable quality, and thicker parallel-jointed stones, as convenient as bricks in building walls.

The above are the chief varieties of sandstone existing in these beds; but the most noticeable feature is the occurrence of detached volcanic masses, doubtless referable to the period when the underlying beds were torn by convulsive throes, and the fissures injected with molten metal, forming veins and strings of ore. It

would appear that the volcanic eruptions which broke up the solid crust, ejected and hurled wide over the face of the country masses of molten matter, either basalt, or metal, or vitrified portions of the broken sandstone strata.

Scattered over the surface of the moor, and turned up in numbers wherever the plough disturbs the peaty soil, occur what are locally know as "bastard whins," which are, in fact, not basalt at all, but vitrified masses of sandstone, rounded at the edges, and compacted to extreme hardness by the action of heat, but still bearing the impress of numerous vegetable forms.

On the top of the flag stone quarry, eighteen inches below the surface, and resting on the rubbly sandstone, was found, on one occasion, a rounded mass of pure sulphuret of lead, of two stones weight, unconnected with any neighbouring vein, and 150 feet above where ore is known to run.

In the quarry which furnishes the ashlar stone, some parts are much broken up and injured by the occurrence of what are called by the workmen, "robins." These "robins" are round masses of soft partially coherent sandstone, of a dull red colour, disposed in concentric layers, with a nucleus consisting invariably here, of a nodule of basalt, pure hard blue whin. These nodules vary in size from a few ounces, to a ton in weight, and upwards; and the "robins" occur, more or less frequently, from within ten feet of the surface, the commencement of the solid stone, down to the lowest point to which the quarry has yet been worked, about forty feet. The largest masses seem to lie lowest down; and the stone in this neighbourhood is much broken up, and incapable of yielding blocks of useful size.

That these different forms of vitrified matter, basalt, lead-ore, and sandstone, widely scattered over the country, are evidences of extensive volcanic action and eruption to the surface, I think is plain; and I offer these few notes as contributions to the data of some more competent investigator of the changes of our earth, in times remotely past.

EDMONDBYERS, November, 1862.

XLI.—*Entomological Notes.* By V. R. Perkins.

The opening of the season of 1862 gave a fair promise of a better year for Entomologists than the two previous seasons of 1860-1, and hope rose high in the breasts of those who had felt disappointed in having so many blank places still unfilled at the close of last year. Many young collectors then, I fear, gave up all idea of continuing in the pursuit of insects, because they had done so badly, and others thought it was not worth the trouble to go out catching them, but those who did keep trudging on despite of disappointments, and the unpropitious fates, were no doubt amply compensated when those few fine, warm, and really spring like days at the commencement of April brought out numerous *Andrenidæ*, and early *Bombi*, and made the hive bees at the same time remarkably "busy." As the month wore on, the little "spring dagger" moth was in profusion, and I picked several very fine specimens of the dark variety, from the trunks of the beech trees, on the Benton road, not one specimen of which could I get last year. Towards the end of the month, that beautiful "*Bumbler*" Fly, "*Bombylius major*," which has contracted a habit of always falling on its broad back, whenever the wind is a little stronger than usual, and from which position, with its long slender legs, it finds considerable difficulty in righting itself, was more plentiful than I had ever before seen it. How this insect revels in the hot sun, darting from one primrose blossom to another, if but a shade passes over it, it drops to the ground invisible, and now also the curious "Oil Beetle," *Meloe proscarabæus*, was crawling about in all directions.

Early in May, I made several additions to my collection of bees, and several good beetles fell into my bottle.

In June the Ruby Tiger moth, *Euthemonia russula*, was anything but rare, I found it in the wood above Winlaton once, and it was especially plentiful on the Links below Bamburgh Castle. At Gibside I took several good moths, among which may be noticed *Xylophasia rurea* var., *combusta*, rare, the specimen was at rest on the fresh cut portion of an ash pole, rather a singular place for this insect, as the pale colour of the new

wood contrasted greatly with the moth's dark wings. Further on, in the same direction, I caught another uncommon moth, *Acronycta leporina*, as it was flying softly across the road near where the oak wood has been cut down, on the right hand side going to Rowland's gill—and, beyond that turnpike, I captured specimens of *Rhagium Inquisitor*, *Clivina collaris*, and other beetles of uncommon occurrence, on my way to a small bog on the left hand side of the road, where grows the sweet scented willow Salix pentandra, *Linn.;* and where the "greasy" Frittillary, *Melitœa Artemis*, was taken by Mr. Dinning—the beautiful Daddy-long-legs, *Pedicea rivosa*, I also met with in this bog.

From this time, to the end of June, insects continued to occur in tolerable plenty, and I collected many good specimens, and in July when on the links beyond South Shields, I found great numbers of the coast-chafers, *Anomala Frischii*, of which I could not find a single specimen last year, and I then added the dark purple variety which is always very rare in England to my series.

The latter portion of the year has not been nearly so favourable for the development of insect life, and the autumn broods have certainly been below the average. Sugar I have found, throughout the summer, next to useless for the night moths, Many evenings which, appeared propitious for these excursions, I have returned home with empty boxes, or had to depend entirely upon my net for captures, and I have heard similar accounts from other Entomologists widely separated, and therefore conclude it to be a general complaint.

XLII.—*List of Bees taken in the Neighbourhood of Newcastle-on-Tyne.* By Vincent R. Perkins.

I append to these notes a list of the bees I captured during my residence in Newcastle, not as a catalogue, but merely for a guide for any one who may hereafter take *the* catalogue in hand, as I am aware there are many species in the local collections that I have not fallen in with.

Fam. I. ANDRENIDÆ.

1.	*Halictus cylindricus=abdominalis.*	Common on the flowers of the dandelion, Hexham, and along the banks of the Devil's water.
2.	„ *flavipes.*	Scarce, Gibside.
3.	„ *albipes.*	Scarce, Gibside.
4.	„ *rubicundus.*	Common.
5.	*Andrena cingulata.*	Morpeth.
6.	„ *cineraria.*	Common in the pathways about Ryton, and Greenside.
7.	„ *bicolor=Clerkella.*	Common, very abundant round Alnwick.
8.	„ *fulva.*	Gibside.
9.	„ *Gwynana.*	Common.
10.	„ *Trimmerana.*	Common along dry banks.
11.	„ *longipes.*	One at Gibside.
12.	„ *nigro-ænea.*	Common along dry banks.
13.	„ *albicans.*	Common in dandelion blossoms
14.	„ *convexiuscula.*	One at Gibside.
15.	„ *albicrus.*	Not common.
16.	„ *nana.*	Two on the banks of the Devil's water.
17.	„ *minutula.*	Common along the banks of the Devil's water in April.

Family II. APIDÆ.

18.	*Megachile circumcincta.*	In the flowers of the broom, Hexham. South Shields, common. It makes its *nidus* here, of the leaves of *Rosa spinosissima*, burrowing into the pared turf, greatly preferring this to the sand banks.
19.	*Nomada ochrostoma.*	Not very common.
20.	„ *borealis.*	One specimen above Winlaton Mill, in May, 1862.
21.	„ *alternata.*	Common.
22.	*Cœlioxis* ———?	Probably *rufescens*, Blyth.
23.	*Chelostoma florisomnis.*	Common in old gate posts.
24.	*Anthophora acervorum.*	Ryton and Gateshead Fell.

25.	*Apathus rupestris.*	Common.
26.	„ *campestris.*	Common.
27.	„ *barbutellus.*	Common.
28.	*Bombus muscorum.*	Common.
29.	„ *senilis.*	South Shields.
30.	„ *fragrans.*	South Shields and coast southwards.
31.	„ *sylvarum.*	Scarce, coast northwards beyond Whitley.
32.	„ *lucorum.*	Common.
33.	„ *hortorum.*	Common.
34.	„ *scrimshiranus.*	Not common.
35.	„ *terrestris.*	Two females.
36.	„ *pratorum.*	Common.
37.	„ *lapidarius.*	Common.

XLIII.—*Recent additions to the Local Molluscan Fauna, with description of a New Species.* Plate XVII.

Description of a New Species of Naked Mollusca. By Albany Hancock, F.L.S.

Family **Limapontiadæ.**

Limapontia depressa, n. sp. Pl. XVII.

Body oblong-ovate, depressed, swelling behind the centre and terminating in a blunt point, posteriorly, but varying much according to the degree of expansion or contraction; black, with minute yellowish-white spots or freckles, not always present, and very inconspicuous. *Head* rounded in front, and slightly angulated at the sides; the lateral crests less elevated than in *L. nigra*, with the eyes situated near the centre of a white oblong area at the side of each. *Anus* placed in a depression at the posterior extremity of the body. *Foot* yellowish-white, linear, and squared in front.

Length upwards of a quarter of an inch.

A few individuals of the species were obtained, last October, in brackish-water pools at the mouth of Hylton Dene, near Sunderland, associated with *Alderia modesta*, on a Conferva (*Vaucheria submarina?*).

The same animal, apparently, was taken by Mr. Muggridge and Mr. C. Spence Bate, in Loughor Marsh, South Wales, in 1849, similarly associated, and was figured by the latter gentleman in the Report of the Swansea Literary and Scientific Society for 1850, where it is named *Limapontia nigra*. It is, however, readily distinguished from that species by its greater size, more depressed form, and wider lateral expansion, by the backward position of the anus, and the more branched hepatic organ, besides other minor characters. Mr. Spence Bate's specimens seem to have been nearly twice the length of ours.

This species comes very near to the *Fasciola capitata* of Müller, perhaps more so than the *Limapontia nigra*, which has been referred to that species by Professor Lovén; but as Müller had not observed the characters by which these two species are more especially distinguished from each other (namely, the position of the anus and the branching of the liver), we think it better to consider our animal as new, than to revive an old name that may prove to be erroneous.

Occurrence of Antiopa cristata on the Durham Coast. By George S. Brady.

I was fortunate enough to take a single specimen of this beautiful nudibranchiate mollusc, while dredging off Ryhope, in July last. It occurred on a rocky bottom about six miles from land, and in thirteen fathoms water. This, I believe, is the first recorded occurrence of the genus *Antiopa* in our district

Occurrence of Limax gagates, near South Shields. By Richard Howse.

Two or three years ago I found a small slug infesting some of the gardens of this neighbourhood, which I referred to the *L. Sowerbii*, Fer. On forwarding some of them, a short time since, to my friend Mr. Alder, he kindly informed me that they were not *L. Sowerbii*, but the rarer *L. gagates*, and that the species had not before been taken in the North of England.

Most of the specimens obtained have been procured from a small garden, where it has occurred in very great abundance, as certainly not less than 200 specimens have been collected during

the last three years. Though a very shy and retired species, seldom venturing from its hiding place in dusk or during dull wet weather, it is a most pernicious and destructive slug to tender transplanted annuals, doing more mischief in a short time than the *L. agrestis*. The eggs of this species appear to be deposited during the winter, and in April and May the young shew themselves, having attained to the length of half-an-inch.

This species is generally described as dark grey, but the generality of the specimens collected have been of a fulvous or tawny colour on the back, becoming of a paler hue towards the margin of the foot. One specimen has occurred, which was nearly black. It attains to the length of more than two inches, when in motion; when at rest the strongly carinated back is beautifully arched. It may be asked how has it happened that this large and very distinct species has been overlooked so long? Has it been introduced recently? And has it been brought to this neighbouroood in ballast?

XLIV.—*Algological Notes*, 1862. By George S. Brady.

My searches amongst the algæ during the past season have not been rewarded by the discovery of any species new to our district; yet the following seem of sufficient interest to warrant brief record:—

Litosiphon Laminariæ, *Harv.*

On the frond of *Alaria esculenta*, near low water mark, at Whitley Rocks.

Ectocarpus fasciculatus, *Harv.*

On fronds of *Laminariæ*, at low water mark, near Cullercoats.

Ectocarpus Mertensii, *Ag.*

This interesting species I find in great abundance near and beyond low water mark, on a patch of rocks south of the Sunderland docks. The rocks are coated with a deposit of fine mud —a condition which seems almost essential to this plant. It

seems likely, however, that in this locality it will be exterminated by the proposed extension of the docks.

CALLITHAMNION PLUMULA, *Lyngb.*

A small specimen was found washed up near the Sunderland docks.

In an old number of the "Transactions of the Berwickshire Club," I find a notice by Mrs. Gatty of the occurrence of *Callithamnion Brodiæi* and *Ectocarpus granulosus*, near the coves of Holy Island. These habitats were unknown to me at the time of the publication of my catalogue, and being attested by so excellent an observer as Mrs. Gatty, it seems desirable to record them here. There can be no doubt that many additions to our local phycology might yet be made by any diligent investigator who could constantly avail himself of the low tides on the most promising points of our coast, or who would perseveringly hunt over the heaps of rejectamenta which strew the beach in autumn and winter.

XLV.—*Miscellaneous Notices and Observations.*

Electrical Phenomenon observed at Carlisle.—During the cold and showery weather at the beginning of the present month, I witnessed a phenomenon, which I believe to be extremely rare, and an account of which may prove interesting to the members of the Club. On returning from church, on Sunday evening, I was caught in a rather smart shower, and hearing a peculiar hissing sound, I looked about me to ascertain the cause, and was rather surprised to see an electric spark on the tip of each rib in my umbrella; these continued to increase in brilliancy for nearly three minutes, when they gradually disappeared. The umbrella in question, was an alpaca one, with steel framework, and a wooden handle. I communicated the circumstances to Mr. Chambers of the Kew Observatory, and trust that I shall not be considered as making an undue use of his reply, if I quote parts of it here. He remarks, "I am not aware that any similar observations are on record, but believe that this case admits of

an easy explanation, by a comparison of the circumstances with the state of a Leyden jar (of which the rod of the conductor is pointed—the brass-ball having been screwed off), highly charged with either kind of electricity, and surrounded by a dry atmosphere. Dry air being a bad conductor, the electricity of the interior coating of the jar passes to the air by minute discharges, which give rise to a hissing sound similar to that which you describe. It is a well-known fact that drops of rain when they reach the surface of the earth are generally in a very different electrical condition to that of the surrounding air. I conceive that as soon as the covering of the umbrella had become moistened, this and its metallic ribs may be regarded as an electrical conductor, supported by an insulatory (dry wood) handle. The accumulation of electricity in such a conductor, when charged, is known to be greatest at the points. Regarding, therefore, the rain which wetted the umbrella (in the first-place), as possessing a definite electrical charge, it is evident that this charge would be so distributed that the accumulation would be much greater at the points of the ribs of the umbrella than elsewhere, and if the intensity became sufficiently great, discharges, minute and rapid, would take place from these points into the comparatively dry (as it frequently is in sudden and heavy showers) surrounding air, exactly as in the Leyden jar described. So soon, however, as the rain began to drop freely and rapidly from the ribs of the umbrella, the appearance of discharges would cease, as the fall of each drop to the ground would diminish the charge of the umbrella, to a greater degree than the fall of fresh drops upon it would increase the same."—*J. N. Robinson, Carlisle, November* 24, 1862.

Roman Remains and Coins found near Stockton-on-Tees.—On September 24th, 1860, when shooting in a stubble field, next to the Old Stockton Manor Mill, my eye was attracted to a small round, but dull, piece of metal, which, on taking up, I found to be a small *silver coin*, of one of the *Henry's*—probably the *Fourth* —of England. The obverse represents the full face of the king, and the head bearing the crown, with the legend much worn, "*Henricus* Rex Angliæ." The reverse has a large cross, and

between each of the four arms, are three balls or pellets. The legend is imperfect, but I take it to be "Civitas Eboraci"—denoting that it had been minted in the "City of York." Again, in the same field, I found, on September 5th, 1861, a fragment of a *human skull*, being a portion of the *os parietale*, well preserved and free from decay. It had been turned up by the plough with the light and dry soil in which it had been buried; but *how* it came there and how *long* it had lain in that field are questions not easily solved. In an adjacent close, I had discovered, several years previously, many pieces of human bones and skulls, which had been dug up at different times, concerning which, I made a short communication to the Ethnological Section of the British Association, at the meeting at Swansea, in 1848, (Report of the Eighteenth Meeting, p. 95-96). I therein suggested the probable solutions for the presence of these *human* remains, either in the recorded battle against the Danes near Bellingham (see *Brewster's* History of Stockton, second edition, p. 10, and *Surtees'* History of Durham, vol. 3, p. 144), or in some subsequent fight, possibly with the Scots at a later period, when they are related to have devastated this part of the country. I picked up, a few yards from the small door of Norton church, on January 5th of this year, a *local token*, struck in the memorable year of the great fire in London, 1666. It was on the side of the footpath, which had recently been dug up and repaired. Its obverse bears the crowned head of the king (*Charles II.*) in profile. It looks to the *left*, whilst that on a sixpence of the same king looks to the *right*. Around the head is the legend—"God save the King." Its reverse presents in the centre, "In Stokton," and around are the names and date, "John Wells, 1666." This little copper token is figured in Brewster's first edition of the History of Stockton, 1796, *No.* 3, and an accurate representation it is of the *size* of the token and of *the very bad* and rough execution of the profile; and the "long hair—*à la Cavalier*," as Surtees writes, is indeed a woeful design of the beautiful and flowing locks of that "lively and engaging" monarch's head-dress. "In the reign of Charles II.," Mr. Surtees observes, that in "Stockton, only one tradesman deemed it expedient to issue his promissory pence." (Vol. iii., p. 182.) *John Wells* himself was doubtless a tradesman in Stockton, and

forty-seven years afterwards, viz., in 1713 and '14 we find a "John Wells," who was then twice Mayor of the borough. After a century and a half later the numismatic art had made great progress in "our town," and in the year 1813, an excellent *penny piece* was issued by the firm of "Christopher and Jennett." This copper token is like the old penny piece of George III., of 1797. Its obverse has a similar sitting figure of Britannia, who holds in her right hand an olive branch, with the sea and a ship in the distance; and its reverse gives a good view of Stockton Bridge, with its five arches and the river Tees. In execution it is not unworthy of the Royal Mint.—*John Hogg, M.A., &c., Norton, October*, 1862.

Tinea granella.—This very destructive little moth swarms in the granaries in Newcastle in myriads, and is quite as injurious to the corn dealers as *Calandra granaria* or *Cucujus monilicornis*, the ravages of which have been most ably delineated by Mr. Bold in Vol. I., p. 33. The larva feeds within the grain, and as soon as ever the weather begins to turn rather chilly, these little white creatures having fed themselves up, come forth and crawl all over the premises in search of some cracks or crevices wherein to undergo their transformations. If you go into any warehouse or even counting house where grain is, in the beginning of autumn, you will not fail to see hosts of these larvæ making their way over sacks, counters, walls, windows, in fact over every thing fixed or moveable on which the eye can settle.—*Vincent R. Perkins, December*, 1862.

Lampyris noctiluca.—Glow-worms this year were not nearly so abundant as they were last season. I, however, managed to get several females again, and from them about fifty eggs; these I carefully watched as I was anxious to rear them, but all proved sterile. I observed no luminous property whatever in them, either immediately after deposition or after they had been kept some weeks. Now, glow-worms' eggs have been observed by some naturalists to be luminous especially about the time of their hatching, and this leads me to enquire whether impregnated eggs are luminous, and sterile or non-impregnated eggs non-luminous? This is possibly the case, and I should be glad to know the opinion of others on the subject.—*V. R. Perkins.*

LIST OF MEMBERS.

DECEMBER 20th, 1862.

Abbes, Rev. George, C., B.A.	Cleadon Hall
Abraham, John	Bold Street, Liverpool
Adamson, Charles	Rock Cottage, Jesmond
Adamson, William	Cullercoats
Adamson, Charles	Field House, North Shields
Adamson, Henry	Field House, North Shields
Adamson, Horatio	Tyne Street, North Shields
Alcock, Samuel, Jun. ...	Sunderland
Alder, Joshua	Summerhill Terrace
Anderson, Joseph	26, Terrace Place
Anderson, Charles	Cleadon Cottage, So. Shields
Armstrong, George	Arcade
Armstrong, Joseph	Jesmond Terrace
Armstrong, Hugh C. ...	Barras Bridge
Armstrong, Leonard, M.R.C.S.	South Shields
Armstrong, Luke, M.R.C.S...	Westgate Street
Atkin, David...	Ryehill
Atkinson, George C., Esq. ...	Wylam Hall
Atkinson, J. Ismay, M.R.C.S.	Wylam
Atkinson, Henry	Gateshead
Atthey, Thomas	Gosforth
Austin, Thomas	New Bridge Street
Backhouse, William	St. John's, Wolsingham
Backhouse, Edward	Ashburn, Sunderland
Bainbridge, Wm., Jun. ...	Chapter Row, South Shields
Barkus, Benjamin, M.D. ...	Gateshead
Barkus, William	Saville Street, North Shields
Barkas, T. P...	Grainger Street
Barnes, J. W...	Durham

Barron, James	John Street, Bishopwearmouth.
Bartleman, Alexander ...	Hatheridge House, Hexham
Bates, J. P., M.D.	
Bell, Henry	Whitley
Bell, Isaac Lowthian... ...	Washington
Bell, John Thomas	Monkwearmouth
Bennett, Francis, F.R.C.S. ...	Gateshead
Benson, William	Allerwash House, Hexham
Bethune, Rev. Angus ...	Seaham Harbour
Bewick, Thomas J.	Allenheads
Bigge, Rev. J. F., M.A. ...	Stamfordham Vicarage
Bigge, Rev. George N., M.A.	Ovingham Rectory
Blacklock, Joseph	Summerhill Terrace
Blagdon, Rev. A. J.	Houghton-le-Spring
Blain, Thomas	Sunderland
Bleazby, R. W., M.D. ...	Northumberland Street
Blunt, Rev. J. H.	Newbottle
Bold, Thomas John	Long Benton
Bolton, Andrew	Infirmary, Newcastle
Booth, George R.	Sunderland
Booth, John	Old Elvet, Durham
Boyd, Edward	Moor House, Durham
Boydell, Rev. Edward Neville	Wingate
Bourne, Wm., M.D., M.A. ...	Howard Street, North Shields
Bowman, R. B.	Victoria Terrace
Boville, E. C...	Belmont Hall, Durham
Bramwell, J., M.D.	Dockwray Square, N. Shields
Brady, George S., M.R.C.S.	High Street, Sunderland
Brady, Henry B., F.L.S. ...	Mosley Street
Bramwell, C., Esq.	Hardwick Hall, Ferry Hill
Briggs, R. S....	The Cedars, Sunderland
Broomfield, Thomas	Eldon Street
Brown, Thomas W.	Villiers Street, Sunderland
Brown, W. H.	North Shields
Browne, Jos. Laing	Hutchinson's Blds., N. Shields
Browell, E. J. J.	East Boldon
Brown, John...	69, Blenheim Street

Brown, John, jun. ... ... 69, Blenheim Street
Brown, Drewitt O. ... ... Jarrow Hall
Browne, Jos. L. ... ... Hutchinson's Bldgs., No. Shlds.
Bruce, Rev. J. C., L.L.D., F.S.A. ... ... Framlington Terrace
Bruce, Gainsford ... ... HarcourtBdgs.,Temple, London
Buck, Robert... ... ... Sunderland
Bullen, Mark W. ... ... Blyth
Bulman, George ... ... Sandhill
Burdon, Rowland, Esq. ... Castle Eden
Burnett, Rev. W. R... ... Lovaine Place
Burnup, M., M.D. ... ... Derwent Place
Burnup, John, jun. ... ... Ryehill
Burnup, William ... ... Warden House, Hexham
Cail, Septimus A. ... ... Quayside
Carr, Ralph, Esq. ... ... Hedgley, Alnwick
Carr, Rev. H. B., M.A. ... Whickham
Carr, W. T. ... ... Dispensary, Newcastle
Challoner, J. S. ... ... Benwell Lodge
Charlton, Edward, M.D. ... Eldon Square
Charlton, W. H., Esq. ... Hesleyside
Charlton, William ... ... Lovaine Place
Chartres, William ... ... Grey Street
Clayton, John ... ... Westgate Street
Clapham, Robert C.... ... Walker
Clephan, James ... ... Chronicle Office, Grey Street
Clephan, Joseph ... ... Gateshead
Clephan, Robt. C. ... ... Catherine Terrace, Gateshead
Cleasby, J. H. ... ... Heworth
Coates, Rev. J. ... ... Anick, Hexham
Cockcroft, L. M. ... ... Victoria Terrace
Cooke, Jonathan ... ... Wharncliffe Terrace
Cooper, George ... ... West Clayton Street
Coppin, John... ... ... North Shields
Cox, J. H. ... ... Sunderland
Crawford, Thomas ... ... North Shields
Crawhall, George ... ... Durham

Cram, David... ... ... Oxford Street
Crawshay, Edmund ... ... Bensham
Creighton, William ... ... Morpeth
Crofton, T. ... ... Sunderland
Crozier, W., C.E. ... ... Quayside
Crossman, Rev. T. ... ... Durham
Culley, M. T... ... ... Durham
Culley, Edward ... ... Copeland Castle, Wooler
Cundill, Rev. James... ... Muggleswick
Daggett, William ... ... Victoria Terrace
Daglish, John ... ... Hetton
Dale, J. B. ... ... South Shields
Dale, Henry ... ... Preston, North Shields
Davis, Robert, M.R.C.S. ... Wreckington
Davidson, Joseph ... ... 4, Albert Terrace
Dawson, Blaydon ... ... Westoe
Dawson, J. Archer, M.R.C.S. Eldon Square
Dees, R. R. ... ... Wallsend
Dees, James W. ... ... Wallsend
De Mey, W. F., M.D. ... Eldon Square
Denham, John S., M.R.C.S... South Shields
Dickson, William ... ... Alnwick
Dinning, Joseph ... ... Haydon Bridge
Dinning, William ... ... High West Street, Gateshead
Dixon, A. W. ... ... Sunderland
Dixon, Henry ... ... John Street, Sunderland
Dixon, William ... ... Tavistock Place, Sunderland
Dixon, John ... ... Bedlington
Dixon, Waynman ... ... Albion Place
Dobson, John ... ... New Bridge Street
Dodsworth, Frederick ... Collingwood Street
Dodgson, Thomas Steele ... Carlisle
Dodgson, Rev. Thos.... ... Hetton Rectory
Dodd, Henry... ... ... The Riding, Hexham
Dodd, J. P., L.L.D.... ... Northumberld. Sq., N. Shields
Dodds, C. H... ... ... Tavistock Place, Sunderland
Dodds, Patrick A. ... ... Howard Street, North Shields

Donkin, A. S., M.D... ... West Clayton Street
Douglas, Robert ... ... Berwick
Dunn, Archibald M.... ... Carlton Terrace
Dwarris, Rev. Brereton E. ... Bywell
Embleton, Dennis, M.D. ... Northumberland Street
Emmerson, W. L., M.D. ... Howard Street, North Shields
Emerson, Rev. T. ... ... Allendale Vicarage
Emmerson, H. H. ... ... Stocksfield
Eno, J. C. ... . Bigg Market
Evans, Rev. J. H. ... ... Park Place West, Sunderland
Falconar, J. B. ... ... Ellison Place
Falconar, W. A. .. ... Howdon
Falconar, J. B., jun.... ... West Clayton Street
Fawcus, John ... ... Bell Street, North Shields
Featherstonhaugh, Rev. W., M.A. ... ... Edmondbyers
Featherstonhaugh, Albany ... Roker
Featherstonhaugh, Edward ... Roker
Fell, H. B. ... ... Biddick House, South Shields
Fenwick, John W. ... ... Tyne Street, North Shields
Fenwick, J. Clairvaulx ... West Clayton Street
Fenwick, George ... ... Dockwray Sq., North Shields
Fenwick John, F.S.A. ... Ellison Place
Fenwick, John ... ... Preston, North Shields
Finch, Rev. T. ... . Morpeth
Finlay, G. ... ... Gazette Office, South Shields
Fitzgerald, W. R. ... ... Durham
Fletcher, J. W. ... ... William Street, Sunderland
Fordyce, Thomas ... ... Warden, Hexham
Forth, Robert ... ... Howard Street, North Shields
Forrest, William ... ... 53, Westgate Street
Forster, George Baker ... Cowpen Cottage, Blyth
Foster, James ... ... White House, Gateshead
Foster, Robert ... ... Ryehill
Fox, Henry G. ... ... Trinity College, Cambridge
Frain, Joseph, M.D.... ... Frederick Street, South Shields
Francis, M., M.R.C.S. ... Hedworth Terrace, Sunderland

Frazer, Alexander	Ashfield Terrace
Frazer, Hugh	Dean Street
Frost, Robert C., M.R.C.S...	Picton Place
Garrett, John	Bigg Market
Geake, Rev. Augustine ...	Willington Rectory
Geike, Rev. J. C.	Foyle Street, Sunderland
George, Henry	West Parade
Gibb, C. J., M.D.	Westgate Street
Gibson, Charles, M.D. ...	Eldon Square
Gibson, Dr.	Birtley
Gipps, Rev. Frederick ...	Corbridge
Glaholm, J. P.	7, Claremont Place
Glover, W. H.	Blenheim Street
Goddard, D. H.	Grey Street
Gowland, G.	High Street, Sunderland
Gray, James J., M.R.C.S. ...	West Sunniside, Sunderland
Greatorex, Rev. Edward ...	Durham
Green, Rev. T. R., M.A. ...	Ridley Place
Green, R. Y....	Mosley Street
Green, William, jun... ...	Durham
Green, Charles H.	North Terrace
Green, Rev. Robert	Long Horsley
Green, Edward	Durham
Greenwell, Rev. W., M.A. ..	University College, Durham
Greenwell, Rev. Alan ...	Durham
Greenwell, Francis	Durham
Greenwell, Robert	Grey Street
Greener, Martin	Fawcett Street, Sunderland
Hancock, Albany, F.L.S. ...	St. Mary's Terrace
Hancock, John	St. Mary's Terrace
Hamilton, James	Sunderland
Hansell, Thomas	Albion Street, North Shields
Hardcastle, W. J.	St. John's Lane
Hare, John	Grey Street
Harrison, Wm.	Foyle Street, Sunderland
Halton, John...	Carlisle
Hall, T. Y.	Eldon Square

Hall, John	Northumberland Street
Hall, James	Northumberland Street
Haswell, F. R. N.	Howard Street, North Shields
Havelock, Michael	Quayside
Headlam, Rt. Hon., T. E., M.P.	20, Ashley Place, London
Hicks, Rev. Herbert... ...	Northumberland Sq., N. Shields
Hodge, George	Seaham Harbour
Hodgkin, Thomas	Tynemouth
Hodgson, James	North Terrace
Hogg, John, Esq., M.A., F.R.S., F.L.S.	Norton, Stockton-on-Tees
Houen, A. C....	Quayside
Howse, Richard	Saville Street, South Shields
Hughes, F. W.	Hawthorn Terrace
Humble, Thomas, M.D. ...	Eldon Square
Hunt, Augustus H.	Birtley House
Hunton, Christopher... ...	Tyne Street, North Shields
Iliff, Rev. George	Field House, Sunderland
Ingham, Robert, Esq., M.P...	Westoe
Irving, George	Central Station
Jackson, Thomas	Camden Street, North Shields
Johnson, W. R. H.	Hardwicke Hall, Monk Heselden
Jullion, Dr.	Forres Villa, Gateshead
Kaye, William	Blackett Street
Kelsen, William	Leeds
Kennedy, J. F.	King Street, South Shields
Kewney, George	Tynemouth
Kidson, John...	John Street, Sunderland
Kirkby, J. W.	High Street, Bishopwearmouth
Kirwood, Rev. R.	Durham
Kyle, Gibson...	Market Street
Lambert, M. W.	Grey Street
Lang, J. F., M.R.C.S. ...	Bishopwearmouth
Latham, William	Birtley
Lawson, M. Alex., B.A. ...	Trin. Coll. Cam., Seaton Carew
Lee, Matthew	Wester Hall, Hexham

Legge, John ... ... Houghton-le-Spring
Legge, Lewis C. ... ... Houghton-le-Spring
Leitch, Thomas Carr... ... Howard Square, North Shields
Leife, Rev. J. E. ... ... Cresswell
Leathart, Joseph ... ... Framlington Terrace
Lillie, Rev. W. ... ... Sunderland
Lindsay, George ... ... Sunderland
Lister, Clement ... ... Elswick West Villa
Logan, Alex. Crosby ... Seaham Harbour
Lowrey, Edward ... ... Broad Chare
Luckley, Goorge, jun. ... Claremont Place
Lyall, George ... ... King Street, South Shields
McChesney, J., Professor of Geology and Minerology, Chicago, U.S. ... ... U. S. Consulate, Newcastle
Macallum, R. B. ... ... Victoria Terrace
Macnay, Thos., M.D... ... Blackett Street
Magnay, Charles ... ... Settlingstones, Hexham
Maling, Christopher T. ... Lovaine Crescent
Maling, E. H. ... ... Esplanade, Sunderland
Marreco, Algernon Freire ... Carlton Place
Marshall, Joseph ... ... Elswick Row
Mather Edward ... ... Grey Street
Mather, Wm. A. ... ... Beech Groove
Mason, Rev. J. M. ... ... Whitfield
Mason, William ... ... Leazes Terrace
Matthew, George, jun. ... High Street, Sunderland
Maughan, Rev. S. B. ... Morpeth
Maughan, J. B. ... ... Humshaugh, Hexham
Mawson, John ... ... Mosley Street
Mawson, Richard ... ... Heighington, Darlington
Maxwell, Edward ... ... South Shields
Meggison, R. S. ... ... Westoe
Mennell, George ... ... Picton House
Mennell, Henry Tuke ... Fenchurch Street, London
Meynell, Edgar J. ... ... Durham
Messent, Philip, C.E... ... Tynemouth

Miller, J. H....	Wellington Ter., South Shields
Moor, John	Durham
Moore, Ant. John	Bede's Tower, Sunderland
Moore, William	Sunderland
Moore, Jos. Mason	Market Place, South Shields
Morison, David P.	Pelton
Moody, Rev. Clement ...	The Vicarage, Newcastle
Morton, Rev. Henry... ...	Knarsdale, Alston
Mounsey, Edward	Sunderland
Mounsey, Jasper C.	Bedlington
Mowbray, C. M.	Westgate Street
Murray, Wm. M.	Medical College, Newcastle
Newall, R. S....	Ferndene, Gateshead
Newton, Rev. J. H., B.A. ...	Cambo
Newton, Rev. W.	St. Mary's Place
Nichol, Rev. John Seymour...	Hetton Rectory
Nicholson, John	Hexham
Noble, Andrew, Capt. R. A...	Elswick Ordnance Works
Norman, Rev. A. Merle, M.A.	Sedgefield, Durham
Ogilvie, Joseph	North Shields
Onslow, Douglas A.	Blyth
Pattinson, J....	Analytical Chemist, Side
Parker, T. P., M.D.... ...	John Street, Sunderland
Peart, Septimus	Dockwray Square, North Shields
Peacock, Reginald	Sunderland
Peacock, Septimus	Sunderland
Perle, James N.	Low Walker
Pemberton, R. L., Esq. ...	The Barnes, Sunderland
Perkins, Vincent R.	Wootton-under-Edge, Gloucestershire
Philipson, Geo. H., B.A., M.B.	Blackett Street
Philipson, John	Pilgrim Street
Pigg, Thomas	West Clayton Street
Pilkington, Edward	John Street, Sunderland
Pilter, W. F.	North Shields
Plummer, Robert	Quayside
Plummer, Benjamin, jun. ...	Quayside

Popplewell, John W. ...	Preston, North Shields
Popplewell, John	North Shields
Potter, Addison	West Chirton, North Shields
Potter, Edward	Tynemouth
Potts, Joseph, jun.	Sunderland
Potts, Robert H.	Heaton Hall
Proctor, B. S.	Grey Street
Proctor, Henry	Tynemouth
Proctor, W. W.	Collingwood Street
Prosser, Thomas	Cumberland Row
Punshon, Nathaniel	
Ramsay, John	Walbottle
Reed, J. Robson	Sunderland
Read, Reginald Bligh ...	Guildford Place, Russell Square, London
Reay, John	St. George's Square, Sunderland
Redmayne, J. Mariner ...	Tynemouth
Reed, Captain, R.N.... ...	Chirton
Richardson, Thomas, Ph. D...	New Bridge Street
Richardson, W. H.	Monkton, Gateshead
Richardson, John George ...	Grange Crescent, Sunderland
Richardson, William... ...	Boughton Street, Sunderland
Richardson, Thomas	Hudworth House, Castle Eden
Richardson, George	Ashfield, Elswick Lane
Riddell, James	Stanley Street, North Shields
Ridley, R. B.	Chapter Row, South Shields
Ridley, John, jun.	Hencotes Street, Hexham
Ridley, Joseph	Cockshaw House, Hexham
Ritson, Henry	Sunniside, Sunderland
Robinson, Isaac N.	Carlisle
Robinson, George	Seal Street, Hexham
Robinson, Rev. Henry ...	Nent Head
Robinson, W. S., ...	Lambton Street, Sunderland
Robinson, T. W. U.	Houghton-le-Spring
Robson, Edward C.	Esplanade, Sunderland
Robson, James	Mosley Street
Robson, William	Leazes Terrace

Robson, Arthur ... ... Fawcett Street, Sunderland
Robson, R. N. ... ... Bailey, Durham
Robson, E. R. ... ... Durham
Sample, Thomas ... ... Bothal Castle, Morpeth
Scott, Stephen ... ... Leazes Terrace
Scott, W. B.... ... ... St. Thomas' Street
Scott, J. J. ... ... Eldon Street
Shield, G. R... ... ... Mosley Street
Shield, John, jun. ... ... Grey Street
Shields, John... ... ... Durham
Shields, Rev. W. T. ... ... Warden Vicarage, Hexham
Shotton, Edward ... ... Tyne Street, North Shields
Shortt, Rev. Edward... ... St. Anthony's
Sidney, W. H. M. ... ... Cowpen Hall
Sidney, Henry ... ... Cowpen House, Morpeth
Simey, Ralph ... ... Fawcett Street, Sunderland
Simpson, J. B. ... ... Ryton
Skipsey, Rev. R., B.A. ... John Street, Sunderland
Skipsey, R. A. R. ... ... John Street, Sunderland
Small, T. O. ... ... Grainger Street
Smiles, Henry ... ... Central Station
Smith, W., jun. ... ... Hexham
Smithard, Rev. Joseph ... Cramlington
Sopwith, T., F.R.S., F.G.S.... Cleveland Square, Hyde Park, London
Sopwith, Thomas, jun. ... Allenheads
Spencer, Michael ... ... Lemington Hall
Spencer, Thomas ... ... The Grove, Ryton
Spence, Robert ... ... North Shields
Spence, John Forster ... Chirton
Spence, J. F., jun. ... ... Chirton
Spence, Thomas ... ... North Shields
Spence, Joseph ... ... North Shields
Stanger, John ... ... *Chronicle* Office, Grey Street
Stanger, J. ... ... Arcade
Stephens, Thomas, M.D. ... Dockwray Square, North Shields
Stephens, Thomas, jun. ... Dockwray Square, North Shields

Stapylton, Henry, Esq.	...	Judge of the County Court, Durham
Steavenson, Rev. Robert	...	Niston
Stevenson, Alex. S. ...	...	Tynemouth
Stevenson, Archibald	...	Wellington Terrace, S. Shields
Stobart, W. C. ...	...	Etherley, Durham
Stobart, Henry S. ...	...	Witton Tower, Witton-le-Wear
Stobart, Matthew ...	...	West Parade
Stokoe, George, M.D.	...	King Street, South Shields
Stokoe, James ...	...	High Street, Sunderland
Stout, George ...	...	Chapter Row, South Shields
Straker, John ...	...	West House, Tynemouth
Sutherland, Robert ...	...	Howard Street, North Shields
Swallow, John ...	..	West Harton Colliery, South Shields
Swallow, John, jun. ...	...	West Harton Colliery, South Shields
Swan, Joseph ...	...	Victoria Terrace
Swan, J. W.	...	Mosley Street
Swanston, William ...	...	Hawthorn Terrace
Swithinbank, Geo. Edwin	...	Arcade
Tate, George, F.G.S.	...	Alnwick
Tate, R. M.	...	Camden Street, North Shields
Tate, William ...	...	Hedworth Terrace, Sunderland
Taylor, John	...	Lovaine Place
Taylor, Rev. Robert...	..	Monk Heselden
Taylor, Richard, M.R.C.S.	...	Whickham
Taylor, Robert ...	...	Peel Street, Sunderland
Temperley, W. A. ...	...	Hexham
Temperley, Nicholas...	...	Westfield House, Hexham
Tennant, Henry ...	...	Woodhonse, Bensham
Thiedemann, Rudolf...	...	Quayside
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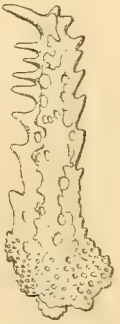

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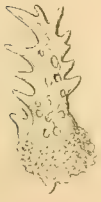

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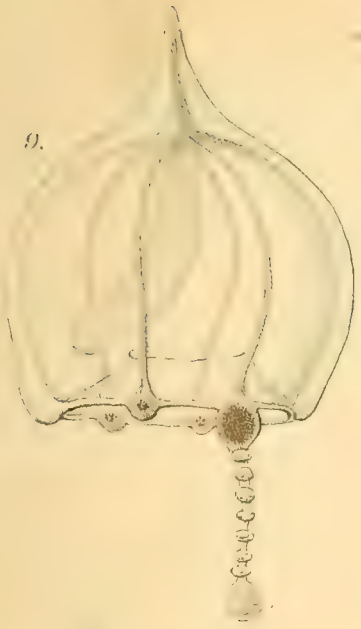
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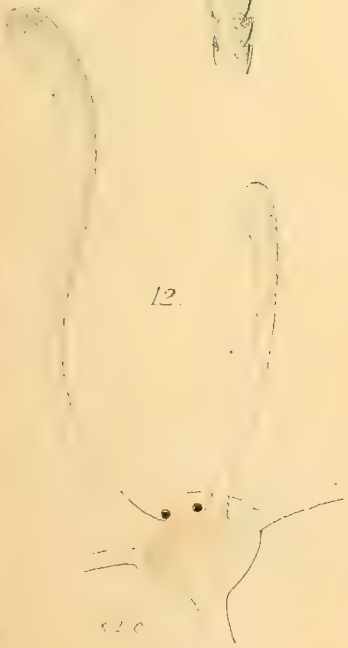
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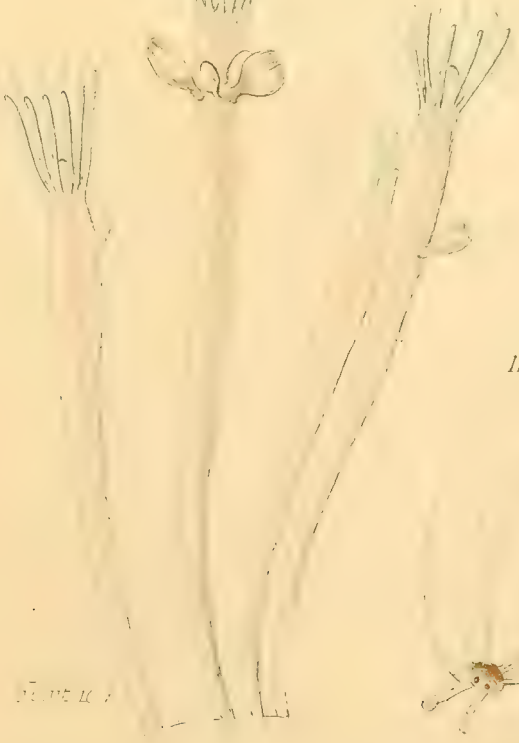

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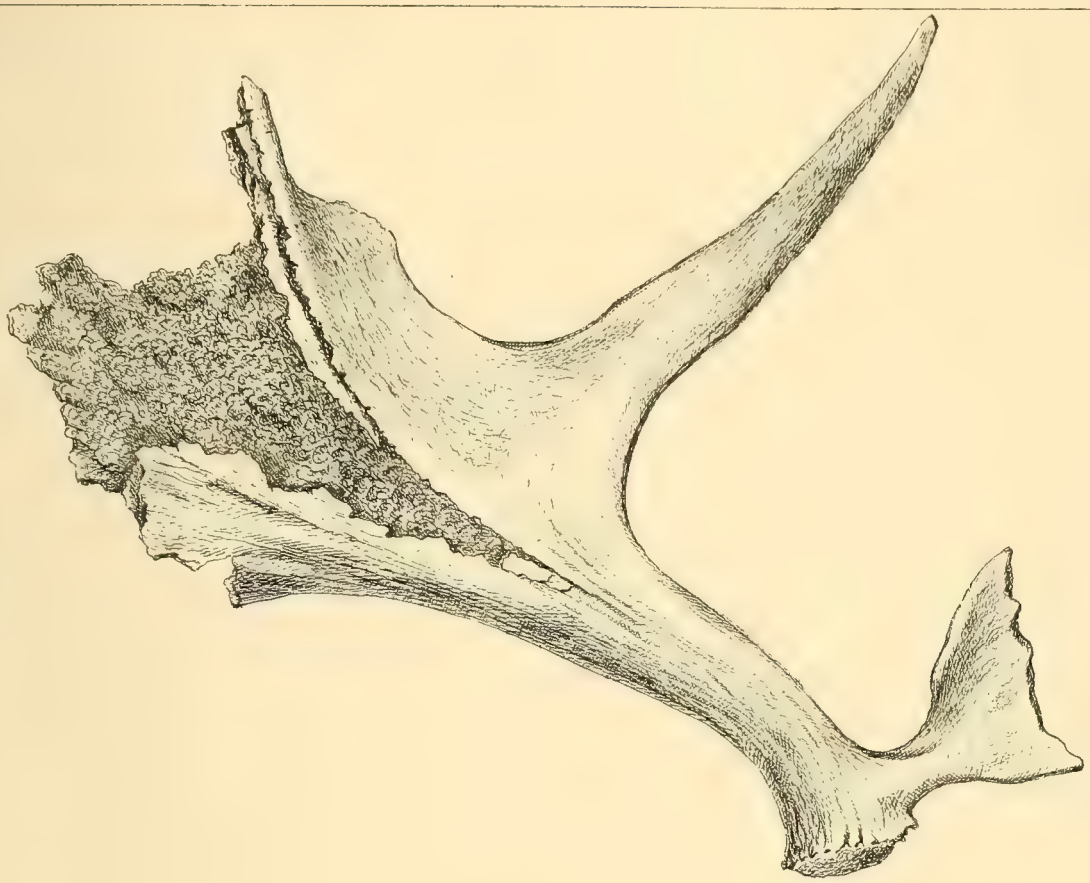

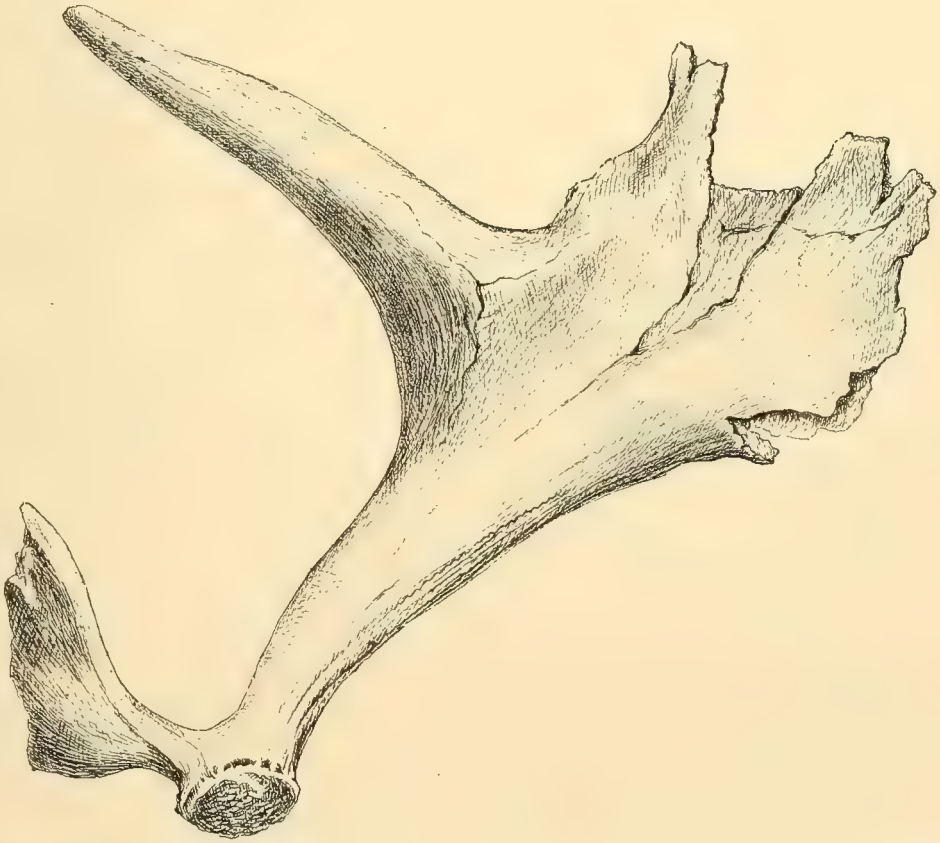

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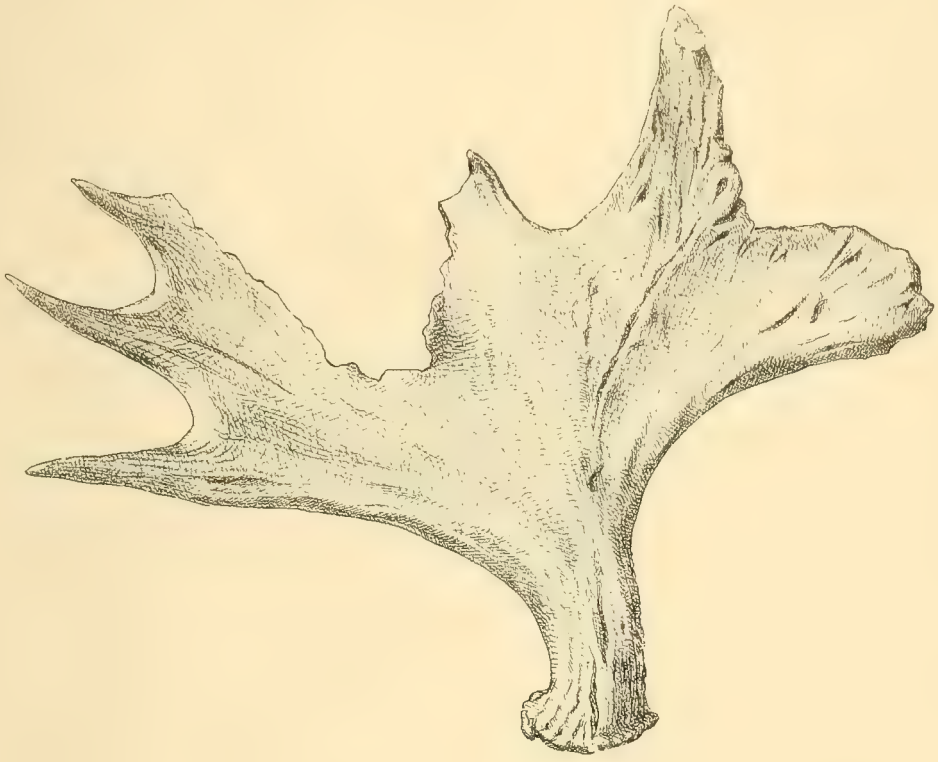

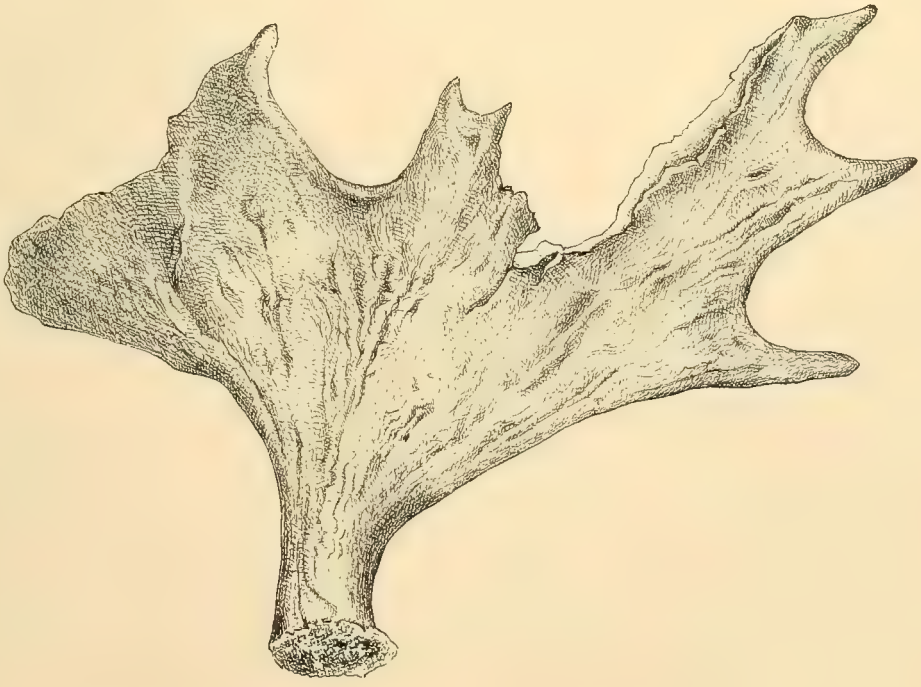

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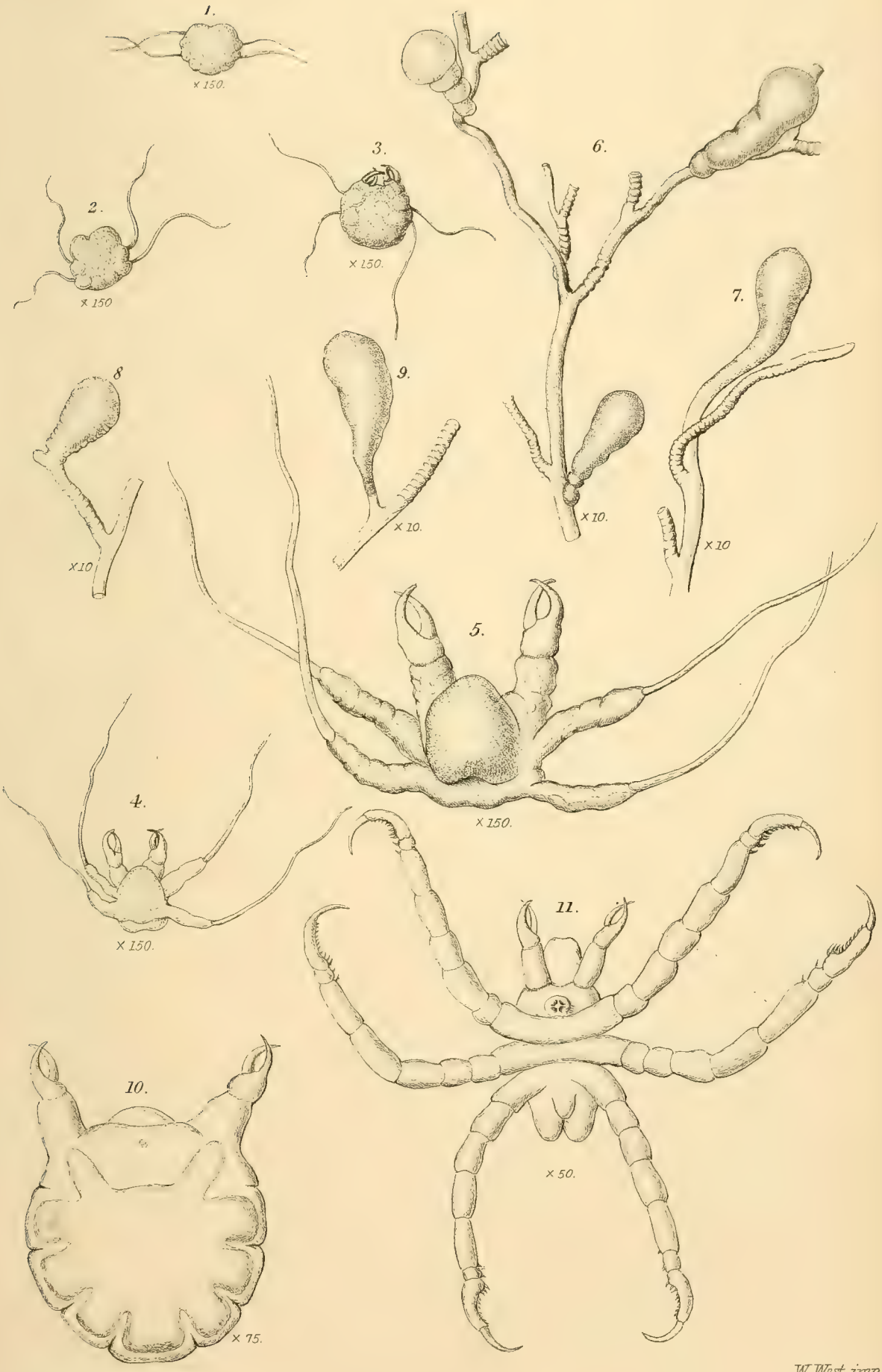

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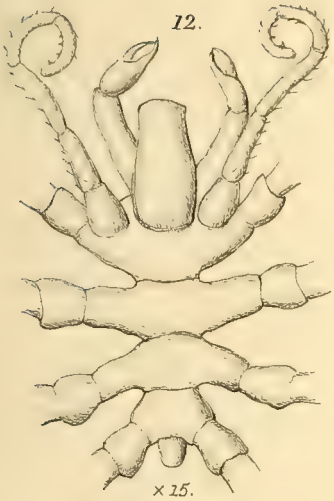

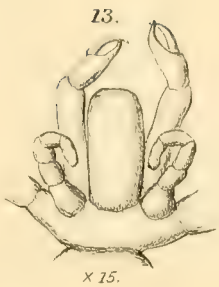

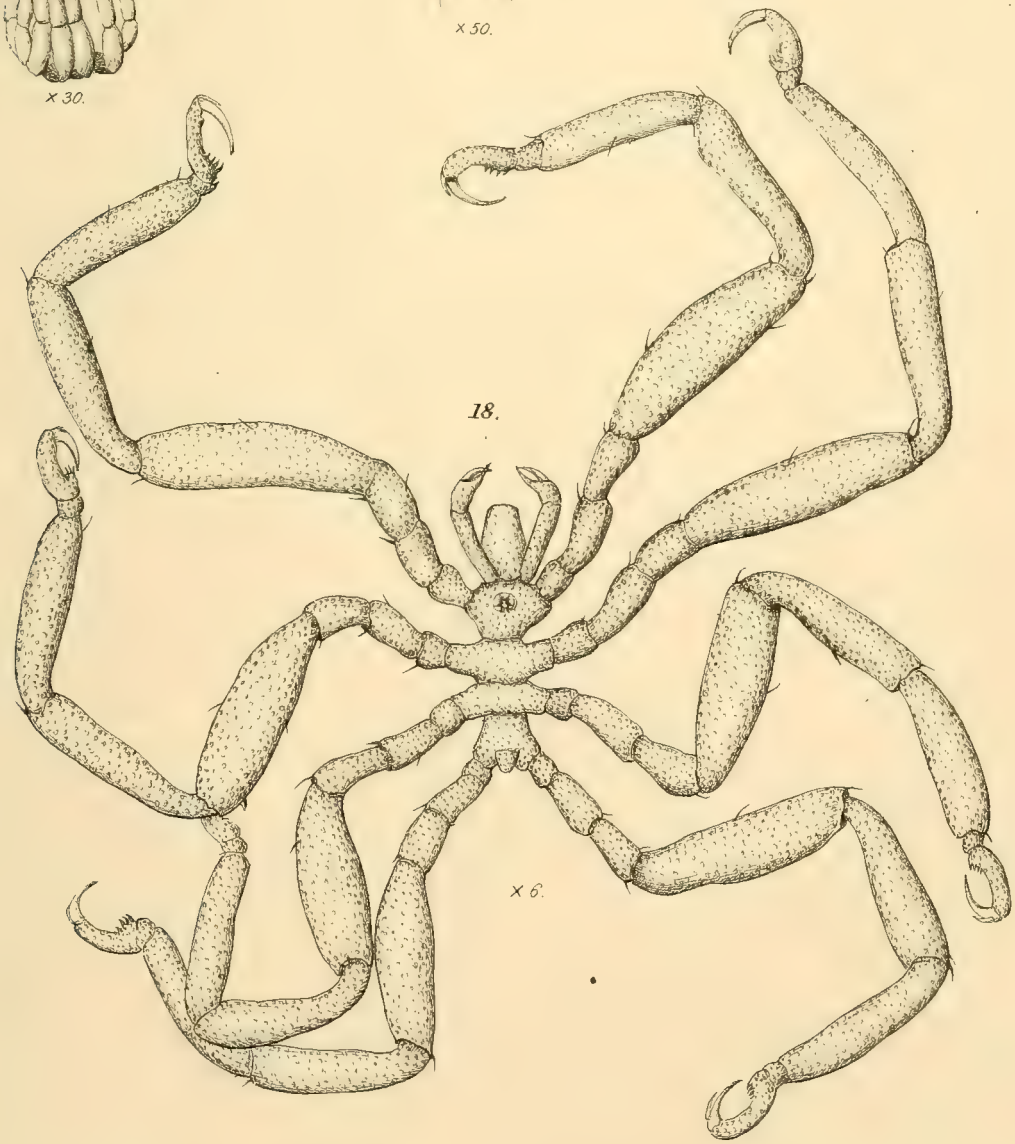

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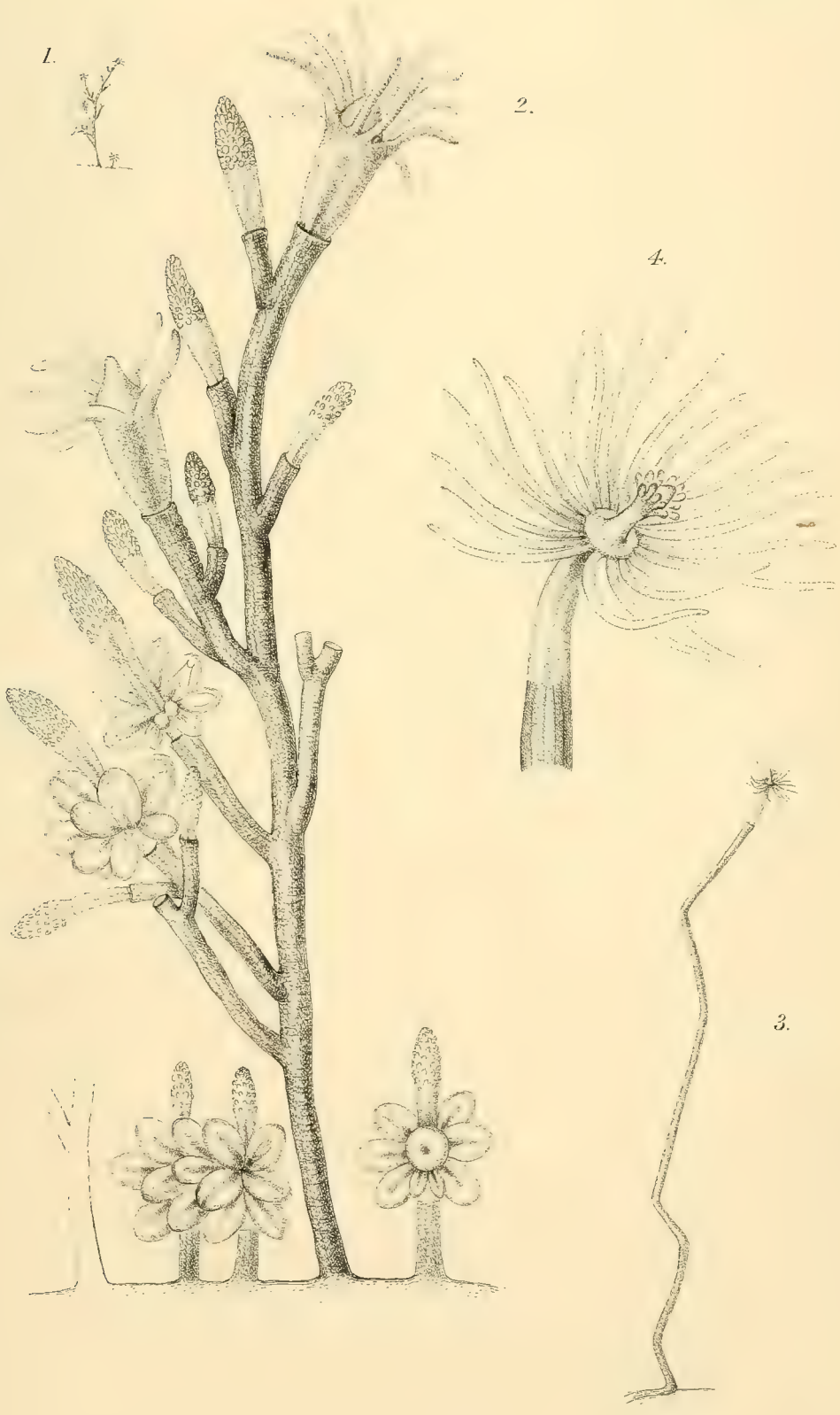

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W West imp.

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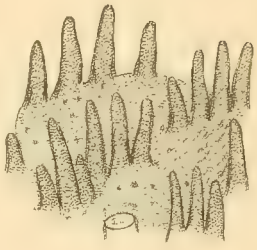

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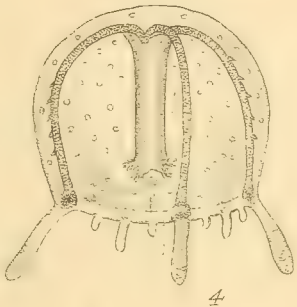

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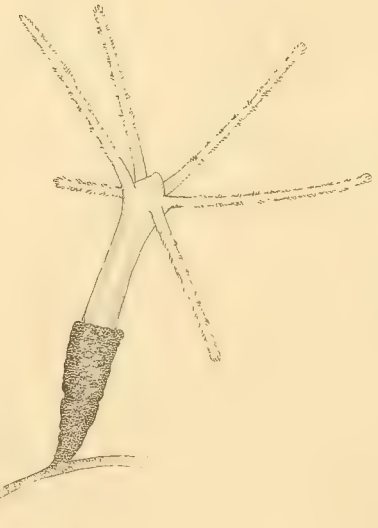

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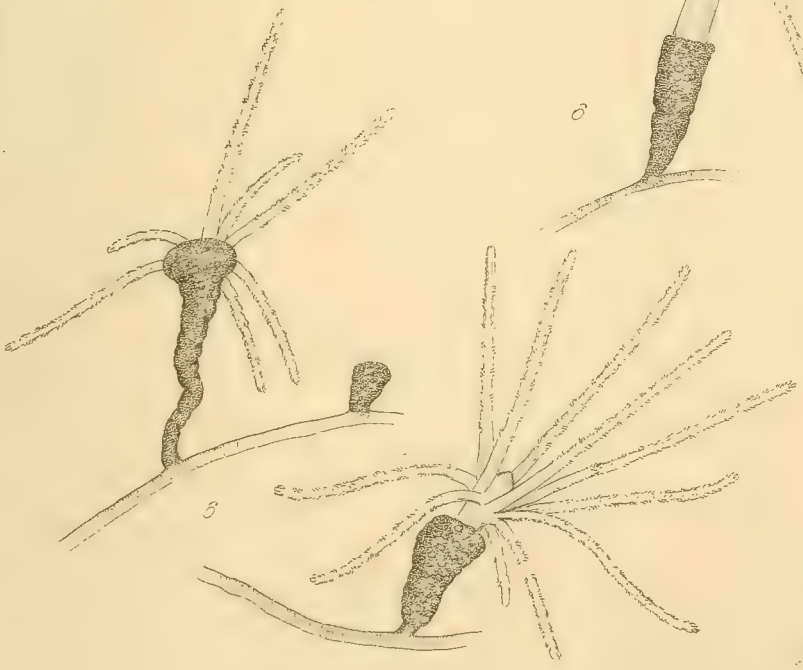

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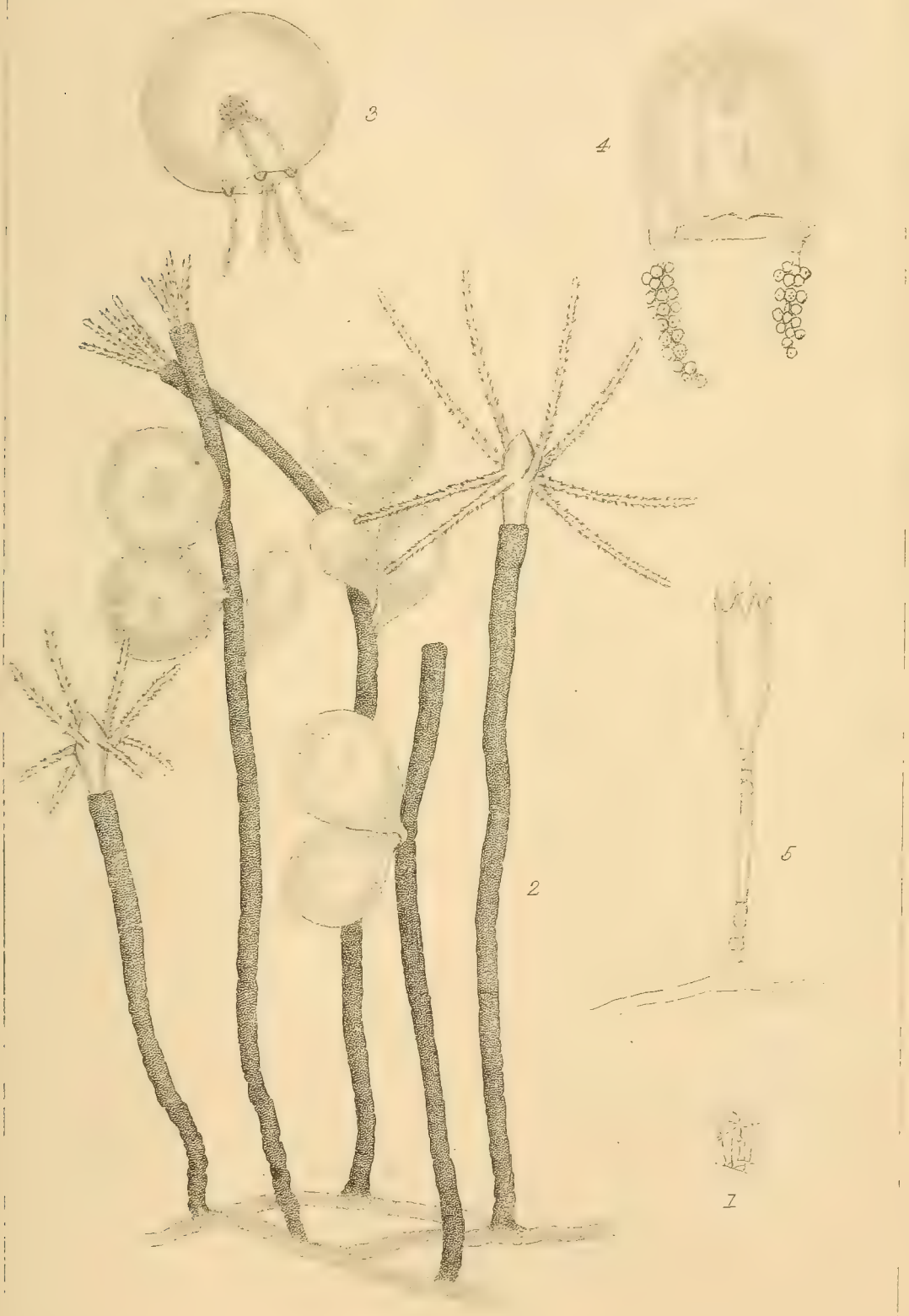

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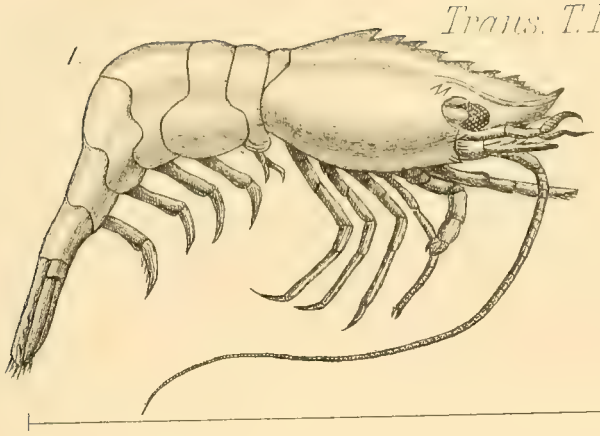

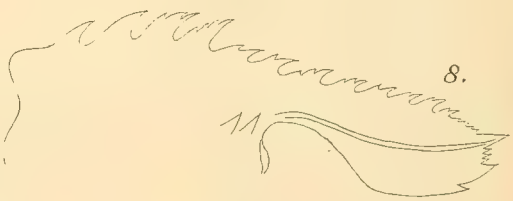

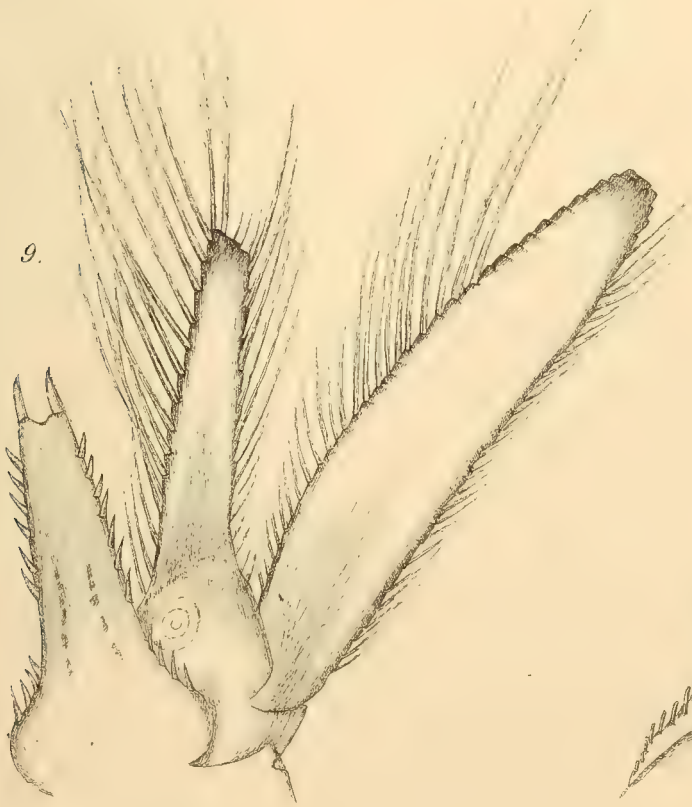

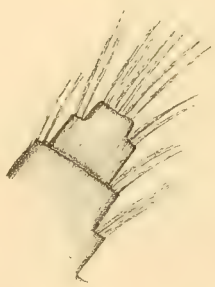

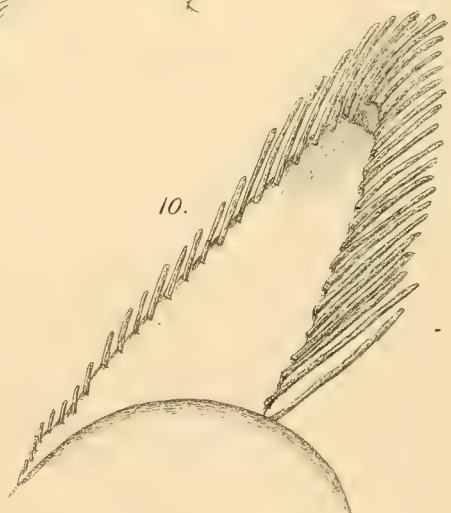

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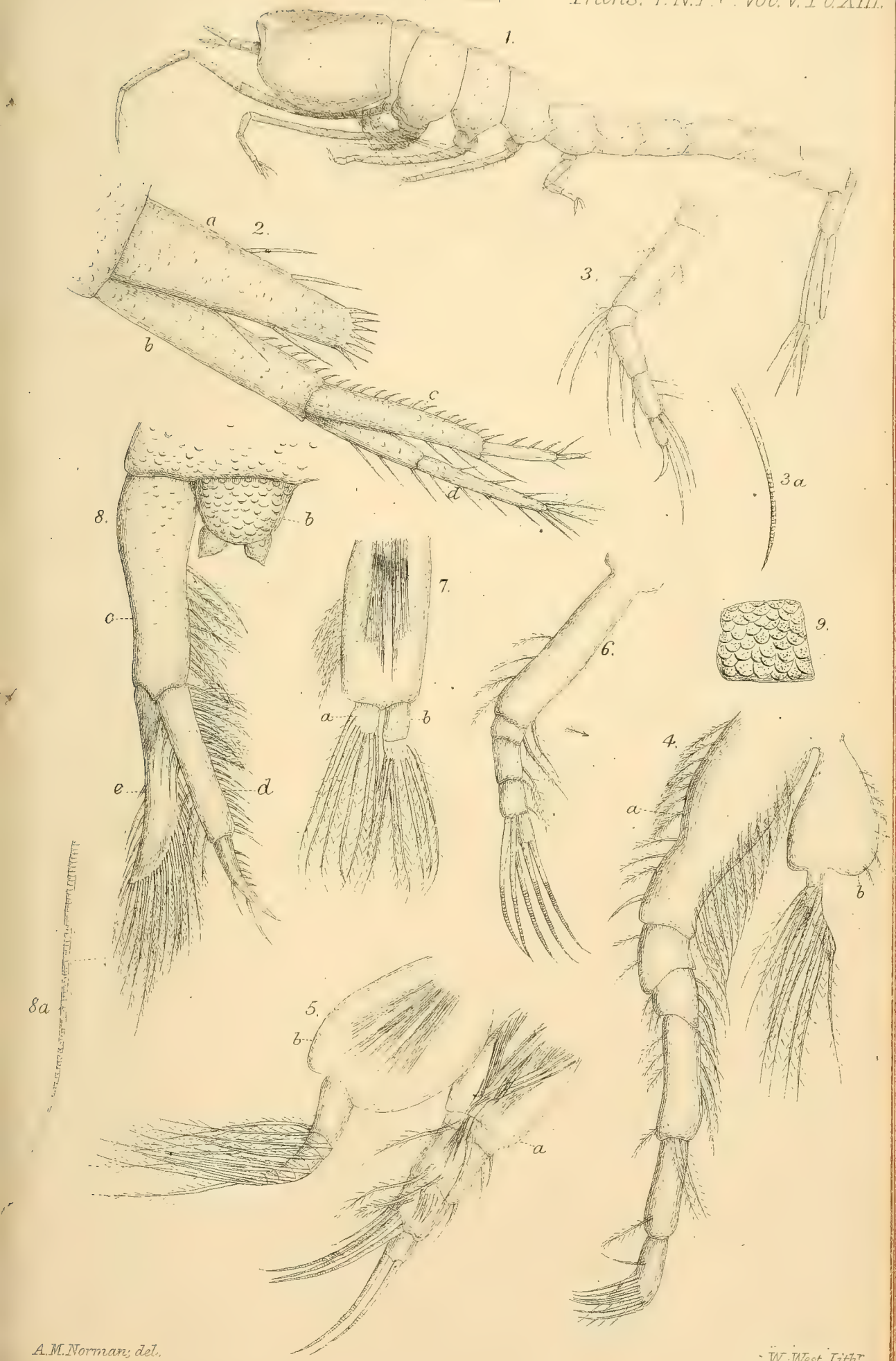

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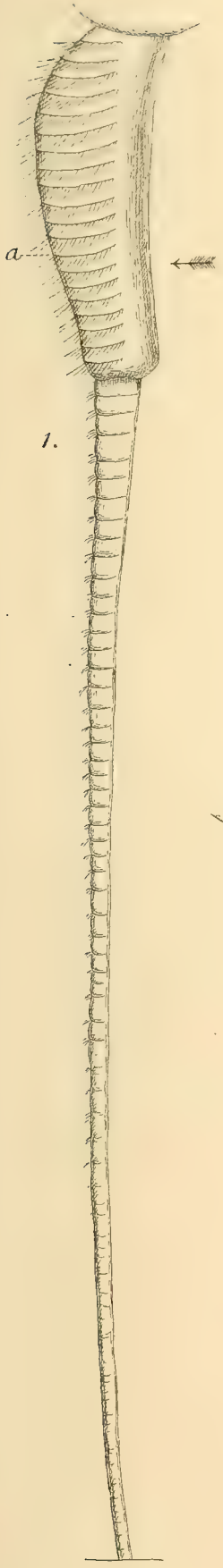

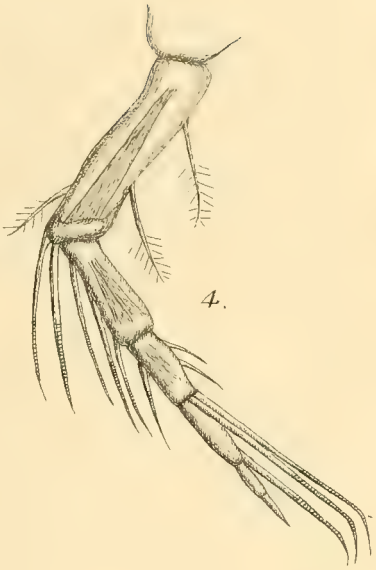

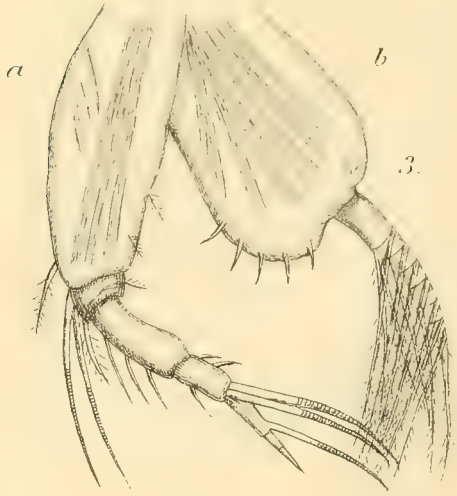

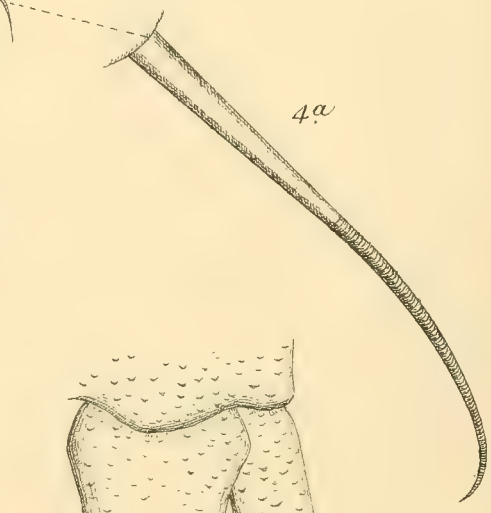

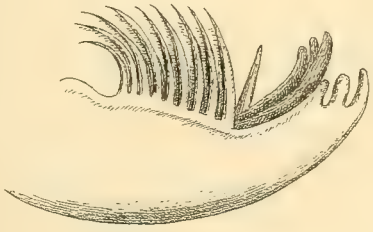

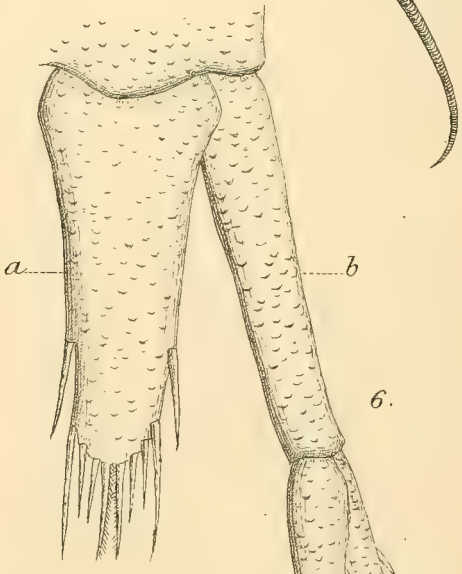

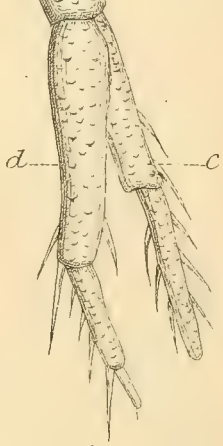

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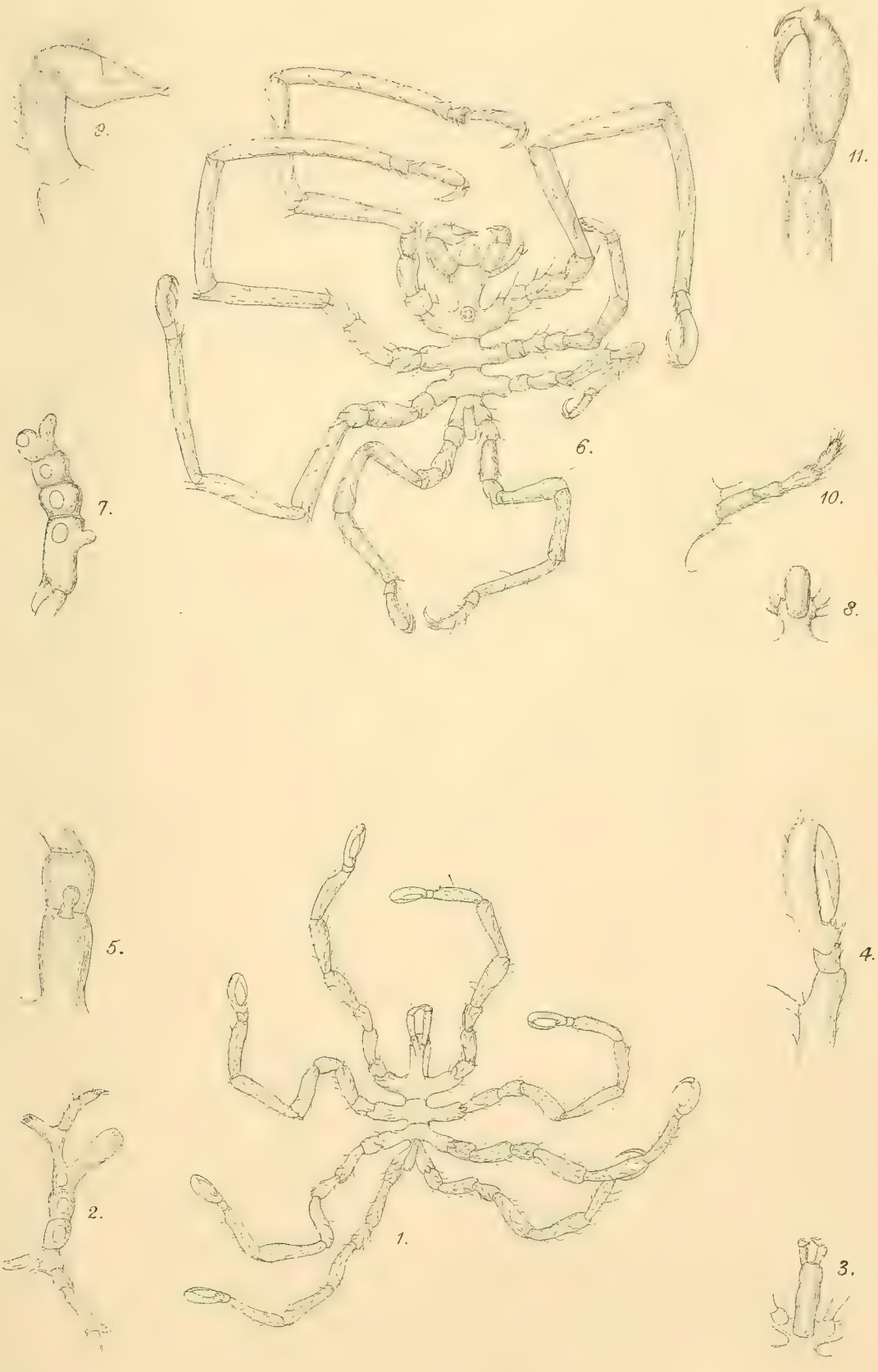
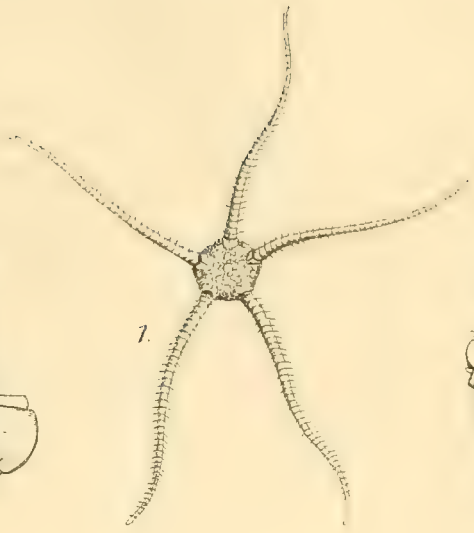


Geo. Hodge, del.

W. West, Lith.r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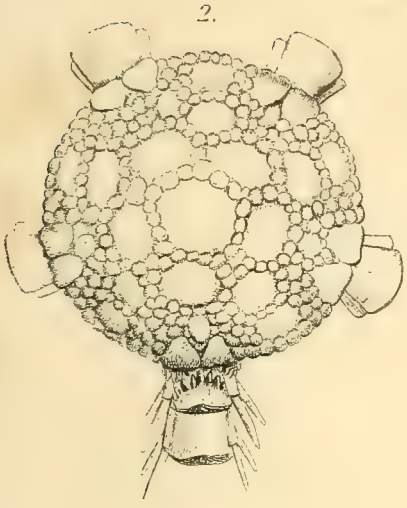
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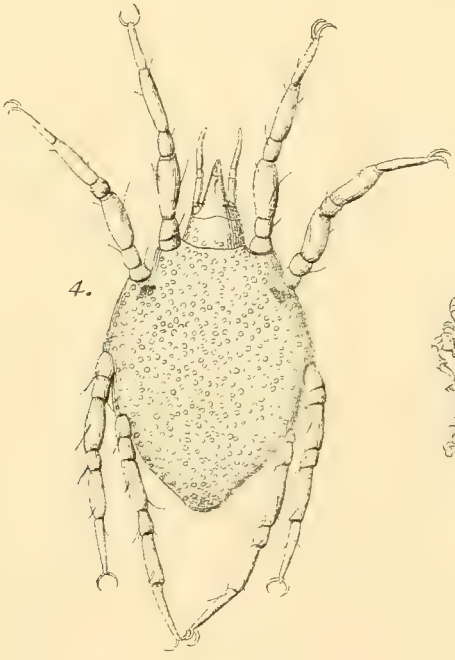
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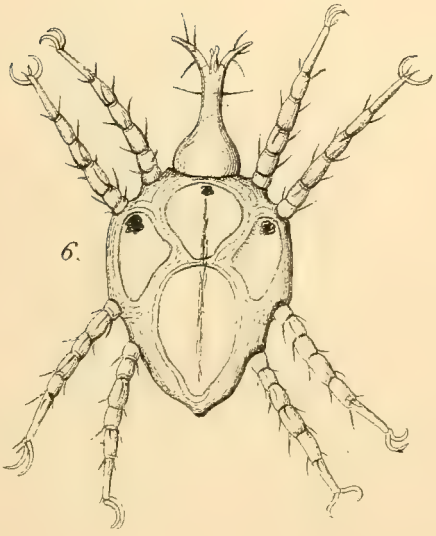
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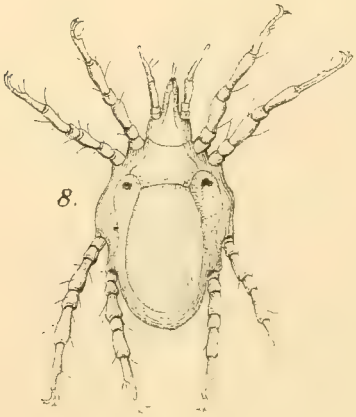
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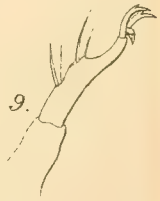
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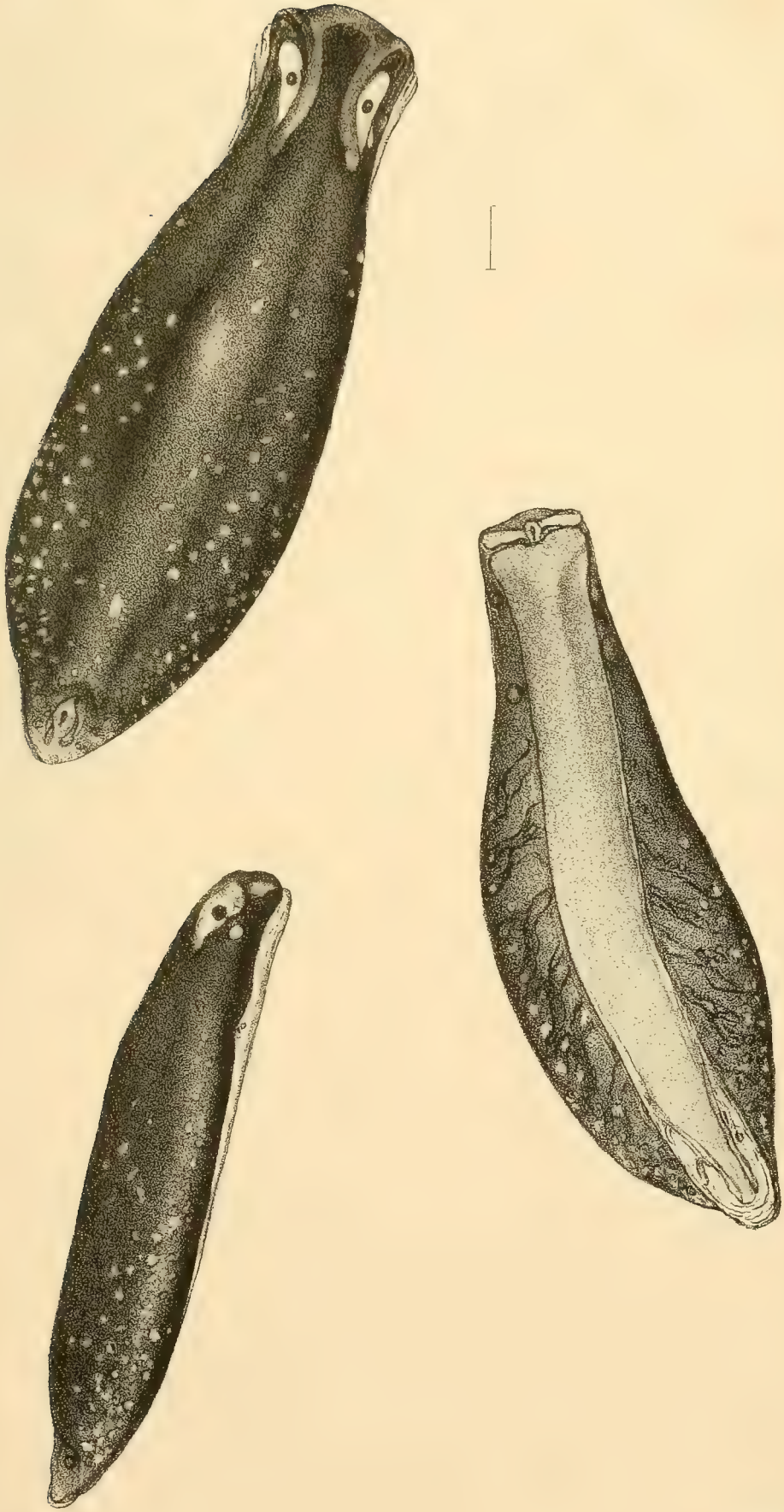
11.

Geo. Hodge. del.

W. West, Lith.r



A. Hancock del.

W. West Lith.r

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